COMPUTERWORLD

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NEWSPAPER

SPECIAL REPORT

Inside — Systems and Utility Software: Weighing the Alternatives

Five Japanese 'Stung' in Buy Of IBM Secrets for $650,000

By Jeffry Beeler
CW West Coast Bureau

SAN JOSE, Calif. — Five employees of two leading Japanese electronics firms were arrested last week for allegedly conspiring to transport proprietary IBM computing technology from the U.S. to Japan.

The arrests climaxed two Federal Bureau of Investigation "sting" operations in which representatives of Hitachi Ltd. and Mitsubishi Electric Corp. reportedly paid a total of about $650,000 for IBM systems secrets they apparently believed to be stolen.

The main targets of the Japanese' alleged technology theft scheme included items like:

- Manuals containing 3081 design information.
- Tapes of MVS/SP Version 2 source code.
- Electronic components for both the 3081 and the 3380 disk system.
- Tapes containing source microcode and test/maintenance programs for the 3081, 3033 and 3380.
- Maintenance documents for the 3380.
- Automated Logic Diagrams for the 3380 and the 3880 disk systems controller.
- Tapes holding 3880 source microcode.

Other prime targets reportedly included documents describing design specifications and manufacturing processes for 4300 and 3081 series microcircuits and tapes containing source code for 370 and 4300 series diagnostic programs.

Nabbed as a result of the undercover investigation were Hitachi senior engineer Kenji Hayashi, described as the payoff scheme's main contact man, two of his Hitachi colleagues and two Mitsubishi employees. FBI agents also arrested a Japanese representative of Nissei Electronics Ltd. and Tom Yoshida, president of Santa Clara, Calif.-based NCL Data, Inc.

With one exception, the suspects have been charged with conspiracy. If convicted, they face up to five years in prison, a $10,000 fine or both.

Similar charges were also filed last week against 12 additional Japanese electronics company employees, nine from Hitachi and three from Mitsubishi. All 12 suspects live in Japan, where they currently await possible extradition. Most of the unarrested employees occupy relatively low-level corporate positions except for Kisaburo Nakazawa, general manager of the Kanagawa Works, Hitachi's CPU manufacturing arm.

In three complaints filed June 22 in

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For Developers and Purchasers

Tax Act May Include Cuts for Software

By Susan Blakeney
CW Staff

LOS ANGELES — If you are a developer or purchaser of software, you may be eligible for tax breaks of which you are not aware.

According to Hank Jordans of the public accounting firm Coopers & Lybrand, Internal Revenue Code 44-F — lost within President Reagan's "voluminous" Economic Recovery Act — provides for direct tax credit to companies increasing their research activities, including software development.

Because "nothing in the tax act refers to software per se," the tax savings might be overlooked, Jordans said. The credit is reportedly equal to "25% of the incremental research expenditures over the base period expenditures."

The favorable tax treatment plan was conceived to stimulate research activities, especially in technology, Jordans explained. He claimed that the U.S. has lost its position as a world leader in patents and new developments, with a large percentage of patents going to foreigners, and this is Uncle Sam's way of stepping up research and development practices.

"Reagan's Economic Recovery Act is so voluminous that some tax practitioners might not even know about" Internal Revenue Code 44-F, Jordans observed. He recalled a speech he gave on the tax aspects of a software license at an American Management Association meeting in

(Continued on Page 8)

Lanier Options Lead Debuts At Syntopican

By Bruce Hoard
CW Staff

KANSAS CITY, Mo. — Lanier Business Products, Inc. led the parade of new products when it introduced five features for its EZ-1 word processor family at Syntopican X, the conference held here last week by the International Information/Word Processing Association.

The EZ-1 3270/Systems Network Architecture data communications option allows the EZ-1 to emulate certain functions of the IBM 3270 family of CRT terminals and printers. The software is priced at $1,800; a universal communications board, also compatible with 3780 and teletypewriter protocols, costs $600.

An option that allows the EZ-1 to run under the Digital Research, Inc. CP/M operating system costs $650. It requires a minimum system configuration of a Lanier EZ-1 with 128K bytes of memory.

EZ-Task offers users the ability to instruct the EZ-1 to access and perform a series of instructions automatically. It requires 160K bytes of memory and costs $700.

(Continued on Page 10)

In Copenhagen, Global Congress Eyes DP Impact

By Marcia Blumenthal
CW Staff

COPENHAGEN, Denmark — International computer industry figures and government officials at the Third Annual World Computing Services Industry Conference here last week focused on the continual displacement of white-collar workers caused by information processing's growing pervasiveness within society.

"Managing the Impact of New Technology" was the theme of the congress, which attracted more than 600 delegates from 29 countries. The conference was sponsored by several software and services trade organizations.

Opening the congress was Svend Auken, the Danish minister of labor,

(Continued on Page 6)

A Personal Interest in Tomorrow

The man on the left today is on the cutting edge of tomorrow. His name is Hal Velie, and he is in charge of personal computers at United Technologies Corp.'s Hamilton Standard Division in Windsor Locks, Conn., an IBM mainframe facility. Velie is pictured with two of his staff — Richard Wright, center, and Dominic Ciaschini, seated, both project leaders in the Management Systems Department's Information Center. Story on Page 2.

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IBM Shop's Personal Computer Manager 'Downloading' More DP to End Users

By Marguerite Zientara
CW Staff

WINDSOR LOCKS, Conn. — "As personal computers become more widespread and people see more and more what they can do, and as memory, disk space and the sophistication of logic increase, we'll be downloading more and more extracts of major files," according to the manager of personal computers for a large industrial manufacturer here.

And as the use of personal computers in the IBM mainframe environment of the Hamilton Standard Division of United Technologies Corp. increases, so will the staff and responsibilities of Hal Velie, supervisor of the Information Center in the Management Systems Department here.

"The Information Center's function is to provide users access to their own data in their own terms," Velie explained. "We combine giving them mainframe tools, word processing and personal computers. We discuss their needs with them and help them decide which of those media is the best one.

"If together we feel that a desktop computer is the way to go, then we help them to configure a vendor's machine and/or software to meet their needs," he explained.

Currently splitting his time "about 50-50" between personal computer and mainframe needs, Velie predicted that downloading to personal computers will increase "quite a bit" at Hamilton Standard within the next two years.

"At this site, the typical user wants to access a lot of data that's already residing in the mainframe and although we're experimenting with downloading, at the moment it's generally considered more efficient to access using a remote terminal," he noted.

That will probably change relatively soon, however. "We're a conservative firm," he pointed out. "That's why I think it typically takes a while for us to convince the end users of anything new, but seeing is believing and when they see what a personal computer can do, that's what piques their appetite."

Discussion Stage

With 20 personal computers installed, 10 appropriated and 10 more "in the discussion stage," according to Velie, he expects his Information Center staff of five to grow by one this year and "maybe two" next year.

"Even today, we're running around like chickens with their heads cut off, answering phones, giving advice," he said. "Normally, at Hamilton it takes a long while to get an appropriation started on anything, but you'd be amazed how fast they move when the subject is a desktop."

The Information Center serves 13,000 employees in all operating units of the division, primarily "supervisory and white collar," according to Velie. The major uses of personal computers are in engineering, production control, purchasing, quality control, financial applications, long-range planning and personnel.

Velie, at Hamilton Standard for 10 years, was formerly a supervisor in a "traditional" large IBM IMS application development group here. "We would work with end users to develop new applications on a mainframe, designed with a staff of analysts concerned with programming an interactive system," he said.

"In fact, this is what led to the Information Center, because by developing so many of those systems, the user now had his hand in many, many disk packs worth of data and he was limited to the degree that he could access them," Velie recalled.

"So the users got frustrated because they knew the data was out there and it took us quite a while to get their requests out of our queue, working in the traditional ways," he said. "With the Information Center we train them to use the tool that allows them to do it themselves." The center was set up in August 1980.

Personal computers at Hamilton Standard are limited to Apple Computer, Inc. and IBM equipment. "We know there are many, many vendors out there and they're all good," Velie noted, "but we have so many people on our staff that we feel we must limit our choice of vendors."

In the area of personal computers, "our biggest problem is that most non-IBM personal computer vendors are not yet geared to sell to the industrial customer, but rather focus on the hobbyist," Velie observed. "They're not used to dealing with the greater demands for faster delivery and larger inventories.

"With IBM, it's the reverse," he noted. "They are very much used to selling people large quantities, so they're having to gear down and sell in smaller quantities in dealing with the individual user. I think both IBM and non-IBM vendors will eventually get to a point where we can deal with them more efficiently."

Currently, it takes up to 60 days to get a personal computer, including red tape, administrative paperwork and hardware lead time, Velie said. "In reality it should take half that time," Velie said, noting that Hamilton's internal paperwork is a source of considerable delay.

This Week

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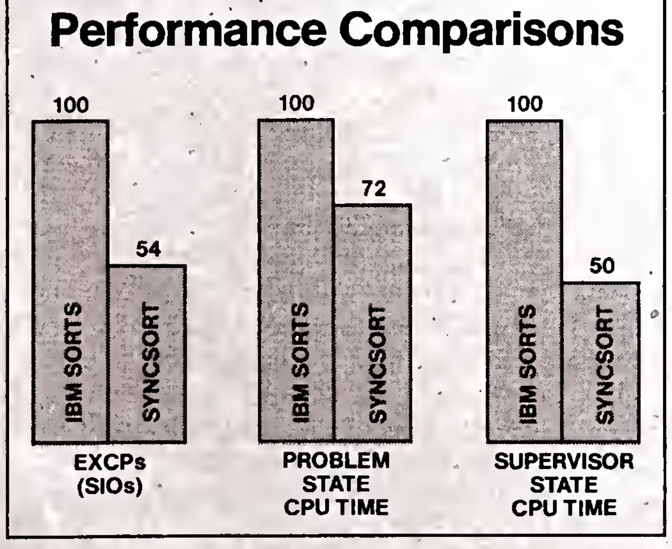
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Sting Nets Five Allegedly Buying IBM Secrets

(Continued from Page 1)

U.S. District Court here, the FBI accused 19 Hitachi and Mitsubishi representatives of repeatedly engaging in shady transactions with undercover investigators who posed as dealers in black-market high technology.

Through Hiyashi and other reputed contacts, the suspects allegedly approached the investigators and offered to buy medium and large-scale IBM systems secrets for varying sums of money. Part of the payments were apparently earmarked for various IBM insiders, who were directed to steal the company's most sensitive computing technology and relay it to the Japanese through the phony dealers.

The suspects then allegedly intended to ship the booty surreptitiously to their respective home offices in Japan, where the material could benefit the Japanese greatly in developing their next generation of IBM-compatible systems.

Disclosure of proprietary IBM product plans would probably allow Hitachi and Mitsubishi to "eliminate costly and time-consuming reverse engineering and thereby shorten the lead time required to bring [new IBM-look-alike systems] to the market," the complaints said.

None of the high-technology items that the Japanese allegedly bought through undercover agents was truly stolen. Instead, the materials were temporarily donated to the FBI and used as "bait" with IBM's full knowledge and approval.

Only about $26,000 of the total Japanese payoffs allegedly came from Mitsubishi. The remaining $622,000 was reportedly authorized by Hitachi.

In the case of Hitachi, money for the illegal technology purchases was provided by Nissei Electronics in Tokyo, an affidavit said. The funds were then allegedly routed to the FBI undercover agents through Yoshida of NCL Data.

All but about $100,000 of Hitachi's allegedly illegal payments went toward the purchase of five IBM high-technology items, including two sets of design documents, MVS/SP Version 2 source code tapes, a 3081 thermal conduction module board and source microcode tapes for both the 3380 and 3880.

All these materials were originally scheduled to be given to the Japanese on June 22. But when the suspects arrived that morning at the designated pickup spot, they were seized by FBI agents and taken into custody.

The arrests thus spared IBM from having to make a potentially damaging disclosure of highly sensitive technology. "IBM did not jeopardize its security" by assisting the FBI in its investigation, the industry giant said in an official statement. "Critically important items ... were never turned over to the accused parties."

Last week's unexpected FBI actions were meant to "send a signal" to international and domestic thieves of American-developed high technology, according to local U.S. Attorney Joseph Russoniello.

During a press conference last week in San Francisco, Russoniello expressed the hope that the Hitachi and Mitsubishi arrests would help "insulate" the U.S.' "precious" computing know-how from further depredation.

News of the arrests and formal charges reportedly hit Hitachi's and Mitsubishi's U.S. subsidiaries like the proverbial bolt out of the blue. "We were very surprised to learn about the allegations," a Hitachi America Ltd. spokesman said; declining further comment except to affirm his company's innocence.

Last week's developments also came as a "complete shock" to Mitsubishi Electronics America, according to a company spokesman, who voiced "confidence" that his employer and all its workers would be exonerated.

IBM Called in FBI After Discovering Thefts

ARMONK, N.Y. — The "sting" operations that nabbed five employees of Hitachi Ltd. and Mitsubishi Electric Corp. in San Jose last week were sparked by an IBM request that the Federal Bureau of Investigation probe the theft of technical documentation, an IBM spokesman said here last week.

"In 1981, IBM became aware that proprietary documents containing important technical and product design information had been stolen. This was very disturbing to us and we informed the FBI.

"IBM cooperated fully in the investigation that has led to these arrests. IBM will make every effort to retrieve the misappropriated materials and will continue to do whatever is necessary to protect the company assets against those who seek to obtain them illegally," the spokesman said.

The stolen documents related to the high end of IBM's product line, specifically the 3081 processor line and the 3380 disk drive, the spokesman said. Items involved included "documents, tapes and components."

IBM did not jepordize its security by turning over information to the Japanese during the course of the FBI sting operations, he maintained. "The critically important items were to be delivered on June 21, in the last meeting. They were never turned over to the accused parties."

DP Security Exec Praises FBI and IBM; Terms Industrial Espionage 'Fact of Life'

By **Bob Johnson**
CW New York Bureau

ARLINGTON, Texas — "I commend the FBI for the work it has done on this case — and IBM for having the guts to cooperate with law enforcement concerning high technology crime."

That was the reaction of James G. Lightburn, vice-president of the Texas-based DP security firm Total Assets Protection, Inc., to the arrest of Hitachi Ltd. and Mitsubishi Electric Corp. employees on charges they conspired to steal IBM trade secrets.

Maintaining that industrial espionage is a fact of life in the data processing industry, Lightburn said that the case did not surprise him. "This type of espionage is a concerted and well organized effort between foreign intelligence agencies and companies and free-lance agents," he contended.

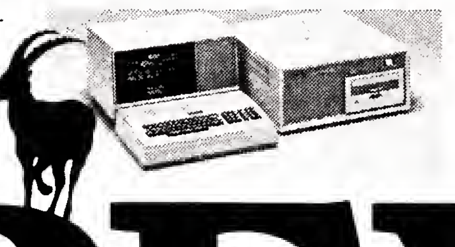
The security expert applauded IBM's willingness to admit its security problem and call in the proper law enforcement authorities. He said that all companies must recognize security weaknesses and publicize illegal attempts to obtain technical assets so that law enforcement bodies like the FBI can become better prepared for these types of crimes.

According to Lightburn, this case may shed some light on "the negative flow of high technology information" out of this country. He expressed concern however, over whether the outcome of this case would be similar to the results of a case in the mid-'70s in which Mitsubishi received computer tape manufacturing technology information by paying a Celanese Corp. employee to "fake a guided tour of the company's facilities."

"Mitsubishi paid the employee about $75,000, received close to $4 million or $5 million in information and was only fined a few hundred thousand dollars," Lightburn said.

Lightburn warned that corporations are often naive when it comes to the vulnerability of their information assets. He said that people will steal information if there is a market for it and if its value exceeds the "cost/risk factor" of getting caught.

Although the FBI has not referred to this case as a counterintelligence operation, Lightburn said that although stealing information is not considered a classic threat to the U.S., the long-term effect of foreign countries acquiring U.S. high technology information could be disastrous. "This country needs a redefinition of the importance of information assets," he said.



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Court Halts Probe of U.S. vs. IBM Dismissal

By Bob Johnson
CW New York Bureau

NEW YORK — A U.S. court of appeals has ordered federal Judge David N. Edelstein to "cease any further inquiry" into claims of conflict of interest concerning the U.S. vs. IBM antitrust suit dismissed by the government last Jan. 8.

The decision came as a result of a hearing held here June 17 in which IBM petitioned the court to bar Edelstein from conducting any further post-trial proceedings in the case and to remove the judge if any other hearings were held.

Three appellate judges concluded in a four-page order that "there is not even colorable jurisdiction in the District Court to pursue any inquiry concerning the merits of the conflict of interest claim." Edelstein had been conducting hearings into whether the dismissal of U.S. vs. IBM should be nullified because of consulting work the Justice Department's antitrust chief, William F. Baxter, did for IBM while a professor of law at Stanford University [CW, March 8].

Edelstein also questioned whether the Tunney Act, which allows public scrutiny into antitrust case settlements, applied to this case.

Both concerns were brought before Edelstein by Philip M. Stern, a philanthropist who submitted the motions amicus curiae, or, as a "friend of the court."

IBM's petition to the Appeals Court questioned Edelstein's inquiries into whether the Tunney Act applied to U.S. vs. IBM. Both IBM and the Justice Department maintained that it does not apply because the case was dismissed, not settled.

No Decision Yet

The Appeals Court elected not to rule on the Tunney Act aspect of the case. A hearing on the Tunney Act was held by Edelstein last month, but he has not yet made a decision on it. The Appeals Court order does not prevent Edelstein from making that decision, but it can rule on that matter at a later date.

At the June 17 Appeals Court hearing, J. Paul McGrath, assistant attorney general in charge of the Justice Department's Civil Division, revealed that an internal investigation by his agency showed that Baxter's dismissal decision was proper and that there was no conflict of interest.

A spokesman for the Justice Department, Art Brill, later amplified the findings of the investigation. He said that Rex E. Lee, the Justice Department solicitor general, examined the results of a report from the agency's Office of Professional Responsibility (OPR) and found that there was "no actual conflict of interest" on Baxter's part.

However, Brill said that "the report did say Baxter's failure to disclose his professional contacts involving IBM resulted in the appearance of a conflict of interest." The report did not suggest that Baxter should have disqualified himself from the case, but that he should have disclosed his contacts with IBM right away.

Couple Indicted In Texaco Theft

By Jim Bartimo
CW Staff

HOUSTON — A former Texaco, Inc. data processing employee and his wife have been indicted for the theft of $18,000 in a scheme that involved the manipulation of Texaco's accounts payable system.

Russell Duane Vauters allegedly programmed the computer to pay his wife, Tamia Lee Lewis, for land she was supposedly leasing to Texaco, according to George Godwin, assistant district attorney for Harris County.

Texaco rents parcels of land for as long as 99 years on which to place its service stations. The monthly payments are made to the landowners through the computer department where Vauters worked.

Indictments filed in the District Court of Harris County against Vauters and Lewis charge that the four payments were made over a four-month period from June 15 to Sept. 15, 1981. "The state is alleging that some phony rent checks were programmed into the computer. Vauters had the computer expertise and worked in the computer department," Godwin said.

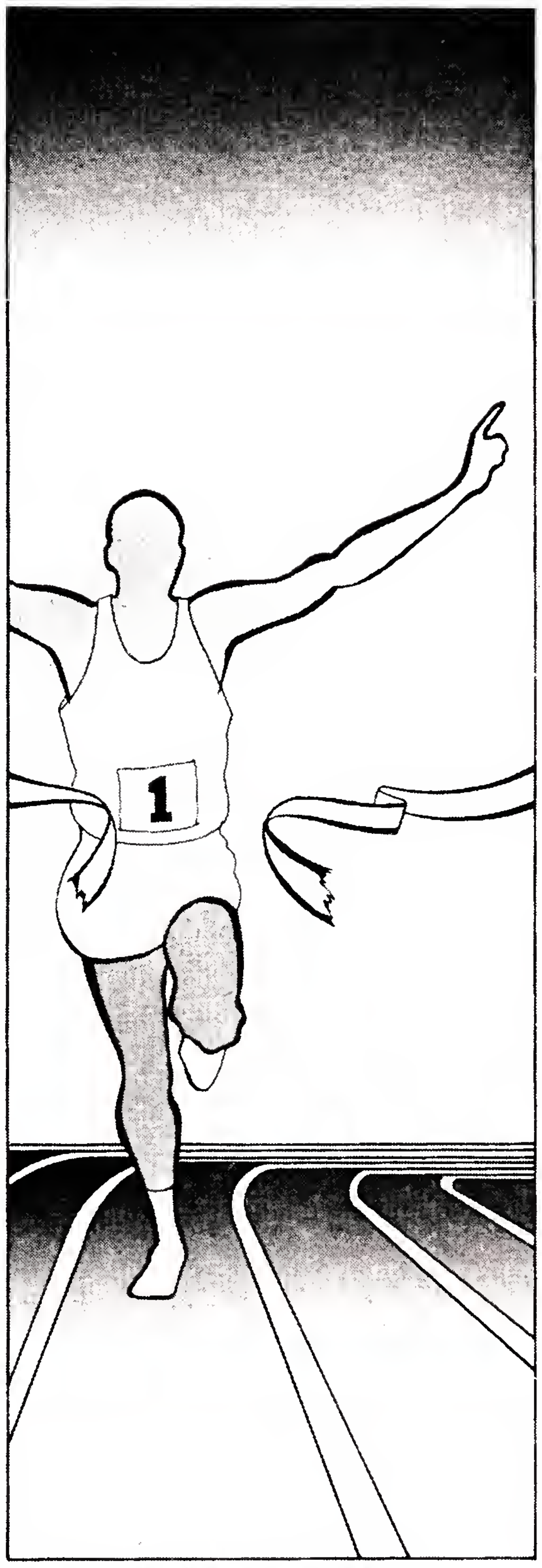
Vauters reportedly assigned Lewis an alphanumeric code that, when fed into the computer, resulted in four payments of about $5,000 each. "The code they used was very close to someone else's," Godwin said.

"An audit developed that showed checks were going to T.L. Lewis," Godwin said. "They checked the discrepancy in the codes and found that they weren't supposed to be making the payments."

Once the problem was located in the DP department, officials still had to trace the funds. "We traced the checks from the bank to a post office box," according to assistant district attorney Brad Beers, who also worked on the case. "We were able to identify the person cashing the checks and the person responsible for their being written."

Vauters and Lewis have each posted $5,000 bail and are awaiting trial.

A spokesman for Texaco would make no comment on the case.



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Fraud Indictments Against CSC Reinstated

By Jake Kirchner
CW Washington Bureau

RICHMOND, Va. — A federal Appeals Court here has reinstated indictments against Computer Sciences Corp. (CSC), several former and present employees and a subcontractor charged with defrauding the government in connection with a $100 million federal DP services contract.

The June 16 ruling by a three-judge panel reversed the decision of a federal judge in Alexandria, Va., who last year threw out the 57-count indictment on the basis that the prosecution failed to guard the secrecy of the grand jury process and on arguments that some of the counts were improperly drawn [CW, March 2, 1981].

The dismissal was appealed by the U.S Department of Justice.

The Richmond Appeals Court upheld the earlier decision to throw out racketeering and bribery charges against CSC, but most of the original charges were reinstated.

The new ruling can be appealed by the defendants; otherwise the case will be returned to Alexandria for trial.

A CSC spokesman at the company's headquarters in El Segundo, Calif., last week said that the firm had not decided whether to ask for a rehearing on the indictment dismissal.

The indictment, originally handed down in October 1980, charged CSC and several employees with bribing a federal procurement officer to obtain its 1972 Infonet contract with the General Services Administration to perform most of the teleprocessing for the federal government between that year and 1977.

The firm, several other workers and a subcontractor were also charged with fraudulently overbilling for their services.

In throwing out the indictment last year, federal Judge Richard L. Williams said the government had failed to present sufficient evidence to support charges under a number of counts and had failed to follow proper grand jury procedures.

The grand jury's work was tainted, Williams ruled, because on several occasions unauthorized persons, including a maintenance worker, entered the hearing room during the jury's deliberations.

But the decision of the appeals panel in Richmond said "the record satisfies us that the invasions of the grand jury proceedings were rare, inadvertent and nonprejudicial . . . Each intrusion brought the proceedings to an abrupt halt, and no testimony was taken in the presence of the unauthorized persons."

The panel also overruled Williams' decision that the government had brought mail fraud and wire fraud charges against the defendants under the wrong statutes.

Worker Displacement Focus of Congress

(Continued from Page 1)

who emphasized that automation is making a huge impact on white-collar workers at a time of high unemployment and poor prospects for economic recovery. The Danish unemployment rate stands at about 12%.

However, employment problems will not be solved by putting restrictions on technology, Auken said. Rather, what is needed are technological policies, "preferably introduced at the international level," that will promote new growth in industry and retrain the labor force.

Within the European community there is an acute need for automation and new technological advances in environmental, transportation, urban renewal and energy industries, he said. But there is a significant discrepancy between the skills of the present labor force and the requirements of technologically advanced industry.

The current economic environment requires "frequent changes in workers' skills and a high adaptability of the labor force," Auken suggested. He called for the broadening of the elementary and vocational education of the labor force to achieve that flexibility.

In addition, "employees must have a favorable attitude toward the new technology." They must be consulted about the introduction of new technology, and they should be made to feel reasonably secure about their jobs. Otherwise, technological change will not be accepted, he charged.

"This cannot be done by companies alone, but through a national labor policy," he concluded.

In the same vein, James Black, president and chief executive officer of the Molson Companies Ltd. of Canada, noted that a Canadian government report on "The Information Processing Society" stressed that "all public sector policies with respect to the information society should be in place now." This, he noted, is not the case.

Women to Lose

Women, middle managers and manufacturing workers have the most to lose from automation. "Neither the business community nor the computer industry will do itself any good if real human and social concerns of automation are ignored," Black declared. And young people with their entire working lives ahead of them have the most to fear from automation, he added.

High-level managers currently have little understanding of computer technology. DP is the single area of business where executives feel uncomfortable, Black said. As a remedy, he is considering installing a desktop computer in a convenient location.

Rankling many of the attendees was Clive Jenkins, general secretary of the 475,000-strong British union of white-collar workers, the Association for Scientific, Technical and Managerial Staffs.

Pointing out that production gains in the major industrial countries during 1973 to 1978 increased significantly while employment growth for the same period dropped dramatically, Jenkins said such changes are "part of a long-term structural change in employment. Although it is true there has been a switch to employment in the service sector during the 1970s . . . the idea of the development of a postindustrial society . . . is a myth."

Jenkins said there is currently a gap of five million between the number of people in the labor force and the number of jobs available.

British unions, he said, are committed to achieving a shorter work week as a response to displacement by high technology. "The introduction of new technology, which has an impact on the nature of jobs, should only be carried out if agreement is reached with trade unions," Jenkins asserted.

Intervention By Governments Frequent Theme

COPENHAGEN, Denmark — Government intervention in the formulation of policies for information processing technologies was a frequently expressed theme at the Third Annual World Computing Services Industry Conference here last week.

While few countries have taken truly definitive steps to formulate such policies, the French government became a forerunner in the effort to manage technological change by establishing the Agence de l'Informatique two years ago. This agency falls under the purview of the ministers of research and industry and the French postal, telephone and telegraph administration.

The president of the Agence de l'Informatique, Bernard Lorimy, told last week's congress that new technology creates more complex interactions in society. He pointed to data requirements involved in various social security programs.

The primary focus of Lorimy's agency is to develop partnerships with vertical industry groups requiring software. The agency finances initial studies of the requirements for developing new software applications for small businesses that wish to adopt information processing technologies.

In addition, the agency helps bring together the potential users of such software systems and the analysts who will develop the systems.

Another major function of the agency is promoting computer literacy in schools and encouraging young people to study informatics and engineering.

The agency is also participating in research in both public and private laboratories aimed at developing new information processing technologies, such as software engineering and office automation.

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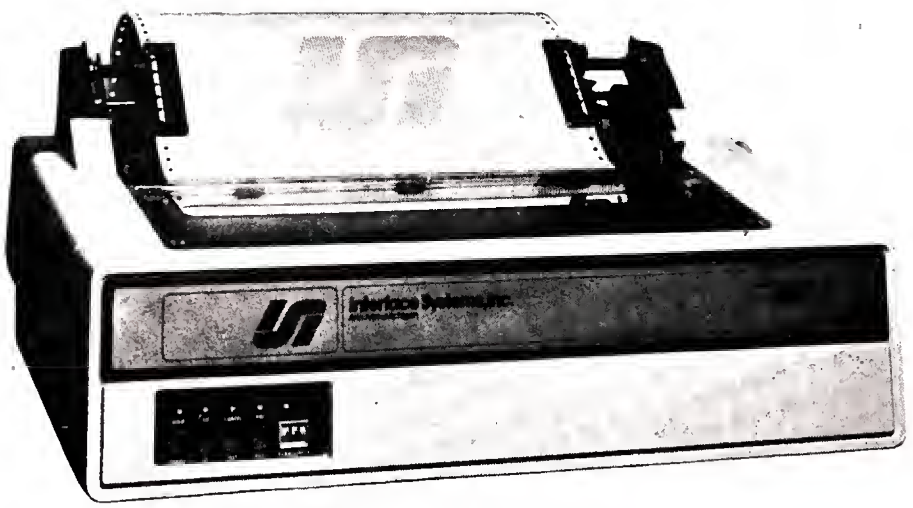

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Destroyed Files, Stole Documents

'Phone Freak' Going to Jail for Two Schemes

By Jeffry Beeler
CW West Coast Bureau

LOS ANGELES — A programmer in his early twenties will soon go to jail for gaining unauthorized access to a Northern California processor, destroying its data files and participating in a scheme to paralyze the Southern California telephone system.

Lewis DePayne was placed on three-year probation and given a five-month county jail sentence after pleading no contest to charges that he illicitly used a San Francisco-based system belonging to U.S. Leasing International, Inc.

DePayne was also convicted of physically breaking into Pacific Telephone Co.'s local computing center and stealing sensitive systems documents, including password lists and technical manuals.

The stolen material was later used either by DePayne or his collaborators to penetrate the phone company's mainframe and illegally alter some of its key data.

Latter-Day 'Phone Freak'

Local deputy district attorney Clifton Garrott described DePayne as a latter-day "phone freak" who delights in finding out access codes, electronically breaking into systems and sabotaging their data. Phone freaks consider electronic vandalism a personal "challenge," Garrott said. "They like to play around, and when they finally figure out how to get into a system, they usually leave some kind of sign to show where they've been so they can brag to their friends."

After swiping Pacific Telephone's local passwords and access codes, DePayne apparently publicized the confidential material through various "electronic bulletin boards," Garrott said. The information later found its way into the hands of the programmer's cohorts, who used the know-how to change the phone company's billing data, enter fake stop orders and otherwise wreak systems havoc.

"From what I've been able to gather through the grapevine, their ultimate goal was to shut down the entire phone system in Southern California," Garrott said. "Phone freaks don't like Ma Bell, and they enjoy harrassing the firm whenever they can."

DePayne, a former employee of a large local accounting firm, has been convicted of computer fraud under California's two-year-old computer crime statute and was sentenced in local court on June 10. His jail term is set to begin in July.

Also convicted in connection with the Pacific Telephone and U.S. Leasing break-in cases were "a few minors" and a female conspirator, who was granted immunity from prosecution in return for her testimony.

DePayne's high-technology crime spree began in December 1980 when he and the woman companion used a Hazeltine Corp. Model 1510 terminal in her home here to gain unauthorized access to U.S. Leasing's Digital Equipment Corp. PDP-11/70.

After bypassing the San Francisco processor's security safeguards, the two used the remote terminal to delete information from files belonging to one of U.S. Leasing's subsidiaries, U.S. Instrument Rentals, Inc. The destruction occurred in files that tell the subsidiary where its rented equipment is located and when it will become available for future leasing.

By destroying the files, DePayne seriously impeded the target company's business. "When U.S. Leasing was contacted by a customer and was asked for a piece of equipment, the company was unable to say where it was located or when it would become available," Garrott said.

DePayne also used the remote PDP-11/70 to create his own files, one of which was designed to inform him whenever U.S. Leasing changed its passwords.

In addition, DePayne peppered the company's files with extraneous information and messages, including "some very foul language," Garrott said. In at least one of his inserts, DePayne boasted openly of his sabotage and threatened to do further damage.

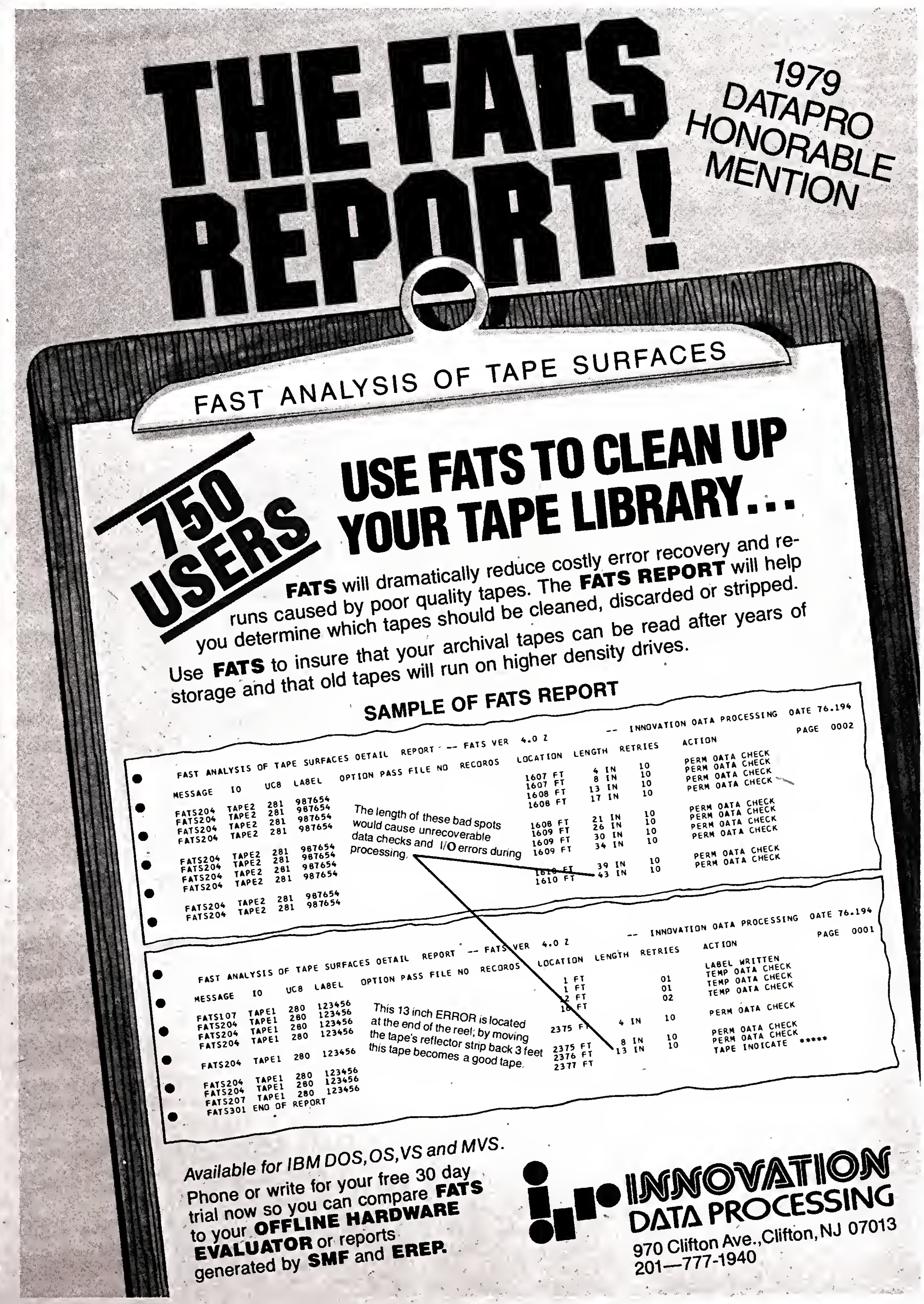
"He was very proud of being able to get into someone else's system, and he was eager to tell other people about his activities," Garrott said.

Newsletter Targets Users of IBM Micro

MINNEAPOLIS, Minn. — Architecture Technology Corp. has announced the *PC Perspectives Newsletter*, a monthly publication for users of the IBM Personal Computer.

The newsletter will focus on hardware and software for the Personal Computer in office and factory environments. It is not geared to the hobbyist, the firm noted.

The publication costs $195 a year ($245 for foreign subscribers). The publisher can be reached through P.O. Box 24344, Minneapolis, Minn. 55424.



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MESSAGE   ID     UCB  LABEL   OPTION PASS FILE NO  RECORDS  LOCATION  LENGTH  RETRIES   ACTION      PAGE  0002

FATS204   TAPE2  281  987654                                1607 FT    4 IN    10      PERM DATA CHECK
FATS204   TAPE2  281  987654                                1607 FT    8 IN    10      PERM DATA CHECK
FATS204   TAPE2  281  987654                                1608 FT   13 IN    10      PERM DATA CHECK
FATS204   TAPE2  281  987654                                1608 FT   17 IN    10      PERM DATA CHECK

FATS204   TAPE2  281  987654                                1608 FT   21 IN    10      PERM DATA CHECK
FATS204   TAPE2  281  987654                                1609 FT   26 IN    10      PERM DATA CHECK
FATS204   TAPE2  281  987654                                1609 FT   30 IN    10      PERM DATA CHECK
FATS204   TAPE2  281  987654                                1609 FT   34 IN    10      PERM DATA CHECK

FATS204   TAPE2  281  987654                                1610 FT   39 IN    10      PERM DATA CHECK
FATS204   TAPE2  281  987654                                1610 FT   43 IN    10      PERM DATA CHECK
```

The length of these bad spots would cause unrecoverable data checks and I/O errors during processing.

```
FAST ANALYSIS OF TAPE SURFACES DETAIL  REPORT -- FATS VER  4.0 Z    -- INNOVATION DATA PROCESSING  DATE 76.194
MESSAGE   ID     UCB  LABEL   OPTION PASS FILE NO  RECORDS  LOCATION  LENGTH  RETRIES   ACTION      PAGE  0001
                                                                                       LABEL WRITTEN
FATS107   TAPE1  280  123456                                   1 FT            01      TEMP DATA CHECK
FATS204   TAPE1  280  123456                                   1 FT            01      TEMP DATA CHECK
FATS204   TAPE1  280  123456                                   2 FT            02      TEMP DATA CHECK
FATS204   TAPE1  280  123456                                  16 FT

FATS204   TAPE1  280  123456                                2375 FT    4 IN    10      PERM DATA CHECK

FATS204   TAPE1  280  123456                                2375 FT    8 IN    10      PERM DATA CHECK
FATS204   TAPE1  280  123456                                2376 FT   13 IN    10      PERM DATA CHECK
FATS207   TAPE1  280  123456                                2377 FT                    TAPE INDICATE *****
FATS301   END OF REPORT
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By Systems Applications, Inc.

Nine Packages Built for Prime 50

By Lois Paul
CW Staff

SAN RAFAEL, Calif. — A series of software products that includes utilities as well as statistical and graphics packages for users of Prime Computer, Inc. equipment has been introduced here by Systems Applications, Inc. They include:

- Perform, a package that reportedly provides information on system performance to system managers of Prime 50 series processors. Perform includes modules for data acquisition, data reduction, plotting, reporting and simulation. The fee for a 20-year license is $1,950.
- The Buffer Management Library, said to increase the speed of binary I/O on Prime computers. It consists of a library of Fortran routines intended to eliminate processor overhead for binary I/O. Its 20-year license fee is $950.
- The Remote Terminal Entry (RTE) program, which Systems Applications said permits communications between user terminals and any network or service bureau that supports dial-up interactive terminals. The package includes software and a special RTE modem and is available with loading instructions, user instructions, an on-line help file and program documentation. Its 20-year license fee is $2,350 with the modem and $1,000 without modem.
- A graphics library, Sailplot, available for use on Prime 50 series systems running under Primos. It includes more than 70 Fortran subroutines designed to allow control over graphics output without prespecified formats. Level I of Sailplot includes an interactive front end that reportedly allows users to develop business graphics without prior programming experience.

The business applications version of Sailplot is currently available; the 20-year license fee for Level I is $6,500. Level II of the package, for scientific and engineering applications, will be available in August for a 20-year license fee of $7,000 plus Level I. Level III, for mapping applications, carries a 20-year license fee of $8,000 plus Levels I and II.

- DOE-2, Version 2 of a Department of Energy Building Energy Simulation Model, a simulation system for modeling the energy behavior of new and existing buildings. A 20-year license fee for its use on Prime 50 computers is available for $10,000.

In addition, Systems Applications has made available for Prime equipment a version of BMDP Statistical Software's BMDP81 library of statistical programs. The programs include data description, frequency counts and linear and nonlinear regression.

The annual license fee for BMDP81 is $2,250 for commercial users, $1,500 for government and nonprofit organizations and $750 for academic institutions.

Systems Applications is located at 101 Lucas Valley Road, San Rafael, Calif. 94903.

Tax Break May Affect Software

(Continued from Page 1)

San Francisco several weeks ago. "Three-quarters of the audience did not know the significance of the new provision [in the Economic Recovery Act] — if they had heard of it at all."

In line with the little-known tax credit provision, Coopers & Lybrand recommended treating the costs of purchased customized software as a current expense. "Such costs are currently deductible for tax purposes if it can be shown that the risk of the usefulness of the computer software is borne by the taxpayer."

Futhermore, the Internal Revenue Service has attempted to treat software as an intangible asset if purchased separately from computer hardware, according to the accounting firm. Intangible assets are eligible for amortization over a short life, as opposed to being depreciated over five years under the tax laws.

Under a third tax benefit, an investment tax credit and a five-year depreciable life are available if the software can be classified as tangible personal property, Coopers & Lybrand said.

Jordans pointed out that while most DP managers might not be aware of the prevailing tax climate, upper management in an organization expects the corporate tax department to know about things like this. Jordans' company advised taxpayers who are thinking about purchasing or developing software packages to review the current tax situation and incorporate tax planning into any contractual agreement with software vendors.

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Geisco Starts Energy Center

HOUSTON — To help meet petroleum exploration and production needs, General Electric Information Services Co. (Geisco) has established an Energy Center here to serve petroleum companies.

The center was officially opened in May, bringing together energy software, high-speed communications access, hardware and technical support and seminars and training programs. This collection of resources is intended to help users in the petroleum industry with production and price monitoring; planning of wells; drilling; running offshore operations; refining and transportation; and financial analysis. Other software featured at the center includes graphics and mapping.

The Energy Center is located at One Riverway, Houston, Texas. Further information is available from Geisco headquarters at 401 N. Washington St., Rockville, Md. 20850.

DP Error Cited As 142,000 Get Wrong Scores In Arizona Tests

By Jim Bartimo
CW Staff

PHOENIX — School officials here noticed some problems with last month's results of the annual achievement tests given to students in grades one through 12 — many gifted children received unusually low scores and some students accustomed to lower grades did quite well on the test.

A total of 142,000 students were given incorrect test scores as the result of a program error by the firm hired to grade the tests, Westinghouse Information Services of Iowa City, Iowa, according to Dr. Thomas Reno, associate superintendent of the state's Department of Education. Incorrect grades showed up in 59 of 215 school districts.

"I'm not a computer expert, but the way it was explained to me is that Westinghouse had so much student data that they had to run it on two separate programs," according to Reno. When the two sets of data were merged, "students were getting half of their own results and half of someone else's. A gifted child may have had his test scores merged with a [learning-] handicapped child's scores."

A Westinghouse spokeman had no comment about the problem.

The standardized exam was given to 460,000 students in the 215 school districts in April, as mandated by Arizona law two years ago.

Problem Spotted

When Westinghouse returned the results to the school districts in May, local officials familiar with individual students' performance noticed the problem.

"They [Westinghouse] were required to get the results to the districts by May 24," Reno said. "There were such gross errors that we were called in to see what had happened. Westinghouse corrected the results of the errors, and we did a hand scoring on a sampling of them," he explained.

When state officials were satisfied with the new results, the districts released the scores to the students about one month late.

Quick Correction

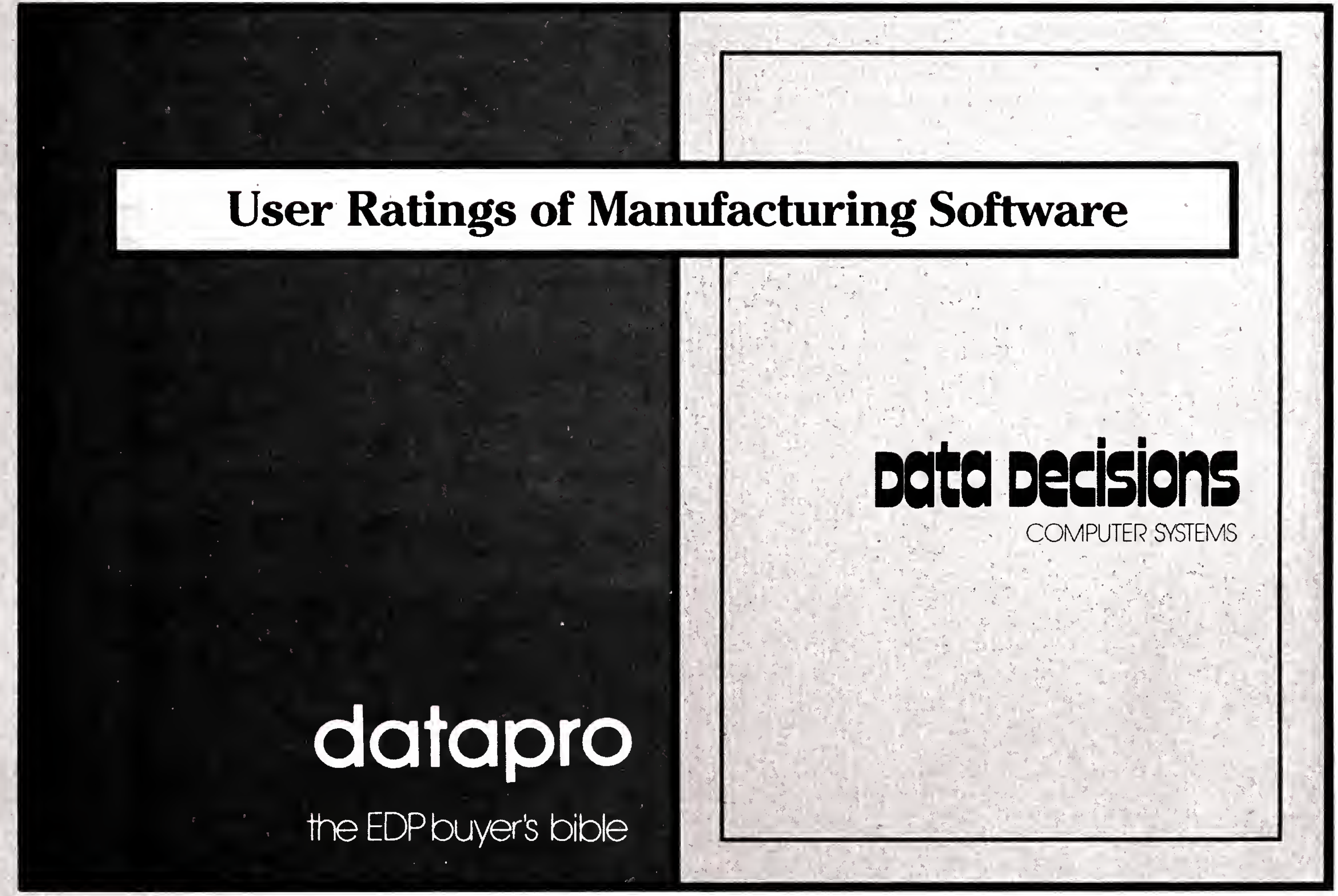
"Westinghouse very carefully and quickly corrected the error," Reno said. "They acknowledged and accepted the error. I couldn't have been happier with the way they responded. I feel the issue has been resolved."

Lawyers from the state and from Westinghouse are working out the settlement, Reno said, but Westinghouse will pay for the cost of the mistake.

Bids are taken by the state each year from companies interested in handling the test processing. Westinghouse has been the lowest bidder since the tests were instituted, Reno said.

Last year's test results were delivered with no problems, according to Reno.

THIS IS GETTING EMBARRASSING



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Lanier Options Lead Debuts at Syntopican

(Continued from Page1)

Datamanager is a records processing program said to provide quick access to data stored in word processing and DP formats and to translate the data into workable information. Also requiring 160K bytes of memory, it costs $1,200.

Basic II, an enhancement to the Lanier Business Basic software option, requires 128K bytes of memory and costs $1,000. Lanier is home-based at 1700 Chantilly Drive N.E., Atlanta, Ga. 30324.

CPT Corp. went to Syntopican X to unveil its 8500 series of word processors. The 8500 features a full-page, black-on-white CRT screen, console tilt, low profile and movable keyboard.

An entry-level system contains 96K bytes of memory, a single 8-in. slimline floppy disk drive, standard communications hardware and multiplexer option. The price range for the four available systems runs from $6,900 to $10,990.

CPT also introduced increased disk storage capabilities with its disk units 10, 20 and 30, costing $2,000, $3,000 and $3,500, respectively. The company is located at 8100 Mitchell Road, P.O. Box 295, Minneapolis, Minn. 55440.

A.B. Dick Co. introduced a mass storage station designed to support a local-area network with up to 254 workstations and hold from 33M bytes to 924M bytes of data. The Magna/Resource Station can be used by the vendor's Magna SL, Magna III and Magna-Writer Systems. A basic unit costs $16,500.

Also new from A.B. Dick were software enhancements for the Magna II — CP/M and Microsoft, Inc. Basic, costing $750.

A.B. Dick is located at 5700 W. Touhy Ave., Chicago, Ill. 60648.

Xerox Corp.

Xerox Corp. introduced at Syntopican X its 820-11 personal computer, said to be an entry-level personal workstation with storage, printing and communications options. It was designed for use by business professionals as a personal computer on an office automation communications network and also as a stand-alone system. It costs $3,295.

Xerox is based at 1341 W. Mockingbird Lane, Dallas, Texas 75247.

Also at Syntopican, Syntrex Corp. took the wraps off Sunnet, a local-area network system that interconnects multiple Gemini Always-Up electronic filing cabinets and polaris cluster systems. Synnet links up to eight clustered systems via a high-speed shielded cable using baseband transmission and carrier-sense multiple access with collision detection link control.

The network package costs $6,500 for each Polaris and $4,500 for each Gemini system attached. The company is located at 246 Industrial Way W., Eatontown, N.J. 07724.

New from Honeywell, Inc. was Infocalc, a menu-driven electronic worksheet with advanced windowing and paging capabilities. The software runs on the firm's entire line of office automation systems, which includes integrated and administrative systems and the single-station Infowriter system.

Infocalc costs $80 on the Infowriter and $120 on dedicated, multiuser administrative systems and the multifunction integrated system.

Savin Corp. announced two software features for its IS 1000 and IS 2000 series, an appointment calendar costing $150 and a dictionary feature for $495. In addition, a financial modeling and planning software package for those two systems is available for $475. Savin's main offices are located at 281 Java Drive, Sunnyvale, Calif. 94086.

Sharedata, Inc. announced an integrated word processing/DP system designated the Omny, which incorporates multiple processors, a dual memory system and large mass storage capability. It supports up to 26 word processing terminals, 128 DP terminals and 43 mass storage devices.

Matrix and letter-quality printers are available and the Omny also supports high-speed line, graphics, ink-jet and laser printers. Prices start at $30,000. Sharedata is based at 1901 Oakcrest, St. Paul, Minn. 55113.

Wang Laboratories, Inc. announced the availability of Alliance software on the Wang VS 45, 90 and 100 models. The base-level Alliance package on the VS comes with a variety of information processing capabilities including word processing, system security and a spelling verifier. The base-level package costs $10,000.

Wang also announced new OIS and VS software enhancements said to provide additional integrated functionality to both word processing and DP environments. The OIS features include CP/M and Multiplan spreadsheet software, a scientific and technical typing capability called Sci-Ty, a paragraph retrieving capability called Document Builder and Interactive Readability.

VS enhancements include Document Builder, Interactive Readability, List Management, Spelling Verifier and a conversion aid called CopyOIS.

CP/M costs $1,000; Multiplan costs $300 for the Wangwriter and $600 for the Alliance and OIS versions.

Wang is located at One Industrial Ave., Lowell, Mass. 01851.

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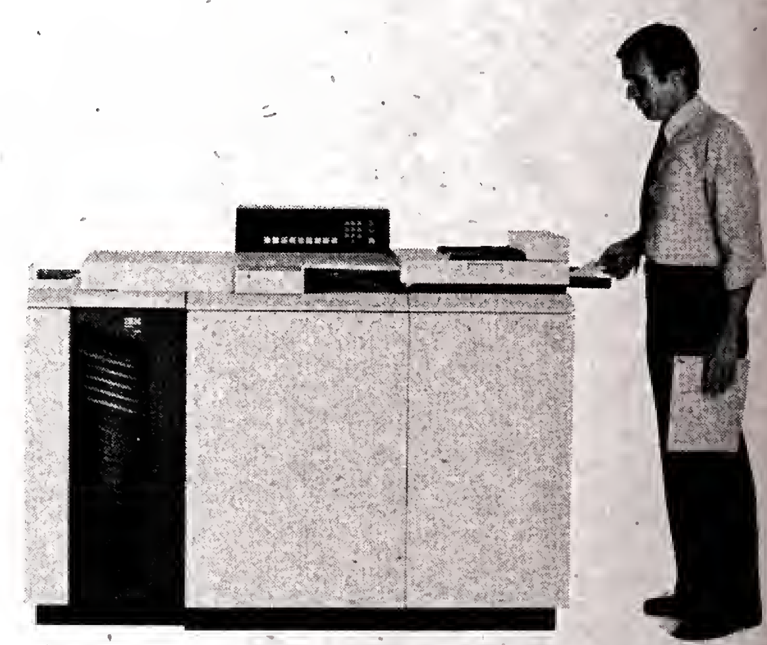

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Divided on Most Progressive Vendor

Syntopican X Attendees Keeping Up With OA

By Bruce Hoard
CW Staff

KANSAS CITY, Mo. — Attendees at the Syntopican X conference here last week were both interested in keeping up on new office automation technologies and divided in their opinions over which OA vendor is the most progressive.

Mike Schnoebelenm, management information systems (MIS) specialist at the Des Moines (Iowa) *Register/Tribune*, said, "I'm here to keep up-to-date on all the new products." His company is trying to consolidate its OA equipment around one vendor. Asked which one, he replied, "I would lean toward CPT," because, he said, users find its word processors easy to work with and he feels the hardware is technically compatible with his needs.

Alan Redinger, president of Burns Printing in Olathe, Kan., was at Syntopican "just to get a little education, get up to date and see what's going on." After talking to representatives of Typographics, Inc., he discovered he could have access to $1 million worth of equipment for $10,000.

"I work in a word processing center and we need some new equipment," said Janice Walruff, word processing coordinator with Trans World Airlines here in Kansas City. As for the most progressive OA vendor, she said, "We kind of like Honeywell. They seem to have more of what we need."

CW at Syntopican

"To see the exhibits and attend some of the seminars" was why Cynthia Williams, administrative coordinator with the firm of Vinson and Elkins of Houston attended Syntopican. She likes "NBI because of their footnoting abilities."

Peggy Jane Lenherr is a teacher at Wamego High School in Wamego, Kansas. She was at Syntopican as part of a word processing symposium for which she receives college credits. "We're hoping to convince our school board to give us something for our department in the word processing area," she said. She likes Lanier Business Products, Inc. because it has good training materials.

Disappointed With Offerings

Jim Cannon, sales manager for LCD Microsystems, Inc., Lenedxa, Kansas, said his "primary reason for being here is to look for new word processing software." Despite that search, Cannon said he was disappointed with the offerings.

His idea of the most progressive OA vendor? "Dictaphone. They keep us aware of what's happening."

"Looking for new market ideas," was why Bill Wilkens, sales manager of Information Management Systems, a systems house in Lawrence, Kansas, came. Asked which OA vendor is the most progressive, he replied, "I'd just have to throw my coin in the air for Savin." He likes its touch control panel and state-of-the-art products.

Sharie M. Kimball is adjunct consultant wiht Mary M. Ruprecht Associates, Inc. She was looking for new software product announcements. She was reluctant to pick a most progressive vendor: "That could be considered a loaded question."

One attendee wished to remain anonymous because he feared "political" retribution from IBM. He was interested in word processing and electronic mail to go along with the IBM equipment already installed at his company. According to him, most of the word processing vendors are offering the same thing with a few "twists."

"I suppose Wang is the most progressive vendor because that is their primary business," he said, adding he would like to purchase Wang products but is locked into an IBM environment.

Program Assists Product Selection

CHERRY HILL, N.J. — Management Information Corp. (MIC) has established a Small Business Computer User Assist Program to help small businesses choose software and hardware.

The program includes a one-year subscription to *Small Business Computer News,* which contains over 42 evaluations of small business systems; a one-year subscription to *Packaged Software Reports,* which evaluates application packages; *Pathways Through Data Processing: Small Business Systems,* which describes the technical aspects of small business computers; *Packaged Software Buyer's Guide*; and *Advances in Data Processing Management*.

A telephone consulting service is also part of the program, whose annual fee is $595. MIC is located at 140 Barclay Center, Cherry Hill, N.J. 08034.

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Photo by B Hoard

George Nagy

Academic Offers Insights

Past, Future of Computer Graphics Charted

By **Bruce Hoard**
CW Staff

CW at Syntopican

KANSAS CITY, Mo. — Computer graphics is the acquisition or creation, manipulation, storage, retrieval and display of pictorial information by means of computers.

That definition was offered here last week by George Nagy at the Syntopican X conference, sponsored by The International Information/Word Processing Association. Nagy is a professor of computer science at the University of Nebraska.

Citing Yankee Group figures, he said the computer graphics industry generated $2 billion worth of sales in 1980, $436 million of which was business related.

Nagy listed several prominent graphics applications after tracing its history back 20 years.

At that time, users needed custom hardware and software, he said. Now, applications such as research, engineering and industrial process control depend on commercially available equipment, which costs between $500 and $500,000.

The professor noted the growth of computer-aided design and manufacturing (CAD/CAM) within the realm of engineering, addressing the use of graphics in industrial process control.

Prominent Application

The most prominent business application of computer graphics includes charts for use by sales and public relations departments. Graphics are particularly useful in the production of repair manuals with many complex illustrations, he said.

Nagy termed the availability of executive workstations such as the Xerox Corp. Star "an attempt to get executives to use the word processing system."

Other conventional applications he mentioned included architecture (floor plans and structural design), home computing ("mostly games") and "art-art" (fine art as opposed to commercial art).

He said he was most interested in and worked with exotic applications most frequently. State-of-the-art work with exotic applications is being done with pattern recognition and image processing.

The professor referred to plotters as the most commonly used graphics output devices. Low-cost plotters range from $500 to $2,000, he said. More expensive precision plotters are used by cartographers, usually placed in a granite bed and cost from $100,000 to $500,000.

The CRT screen is the most widely used soft-copy output device, he said. The CRT is popular because it is relatively inexpensive and offers high resolution.

When purchasing a graphics system, users should check on availability and flexibility, he said, adding vendors should be made to prove their software can handle the user's needs. Portability, or the ability to run the software on other systems, is also important.

Nagy suggested the use of high-level languages. Strong vendor support is also a must, according to him. "You want to make sure there is a strong presence there," he commented.

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Unique WP Needs Cited In Health Care Industry

CW at Syntopican

By Bruce Hoard
CW Staff

KANSAS CITY, Mo. — The rapidly evolving health care industry has a mixture of ordinary and unique information processing needs, attendees at the Syntopican X conference were told here last week.

More data, more clinical information and more regulations mean that the health care field must be treated more like a business than ever before, according to Robert A. Cowan, corporate director of information management for Research Health Services, which is based here. Cowan's firm operates a string of hospitals and nursing homes in four Midwestern states.

Some of the goals that hospitals and other health-related institutions seek include fewer interruptions, less complicated communications between systems, less manipulation and less time spent by professionals on clerical functions. As it stands now, the decision-making process is "too cumbersome" because of these problems, Cowan said.

How Managers View DP

In the past, he observed, too many managers have looked on DP as "a very large cash register," viewed information management and DP as one and the same and have confused the roles of DP and word processing. He stressed the importance of having information management represented on the vice-presidential level.

As it is now, the information management department considers itself to be a client-oriented service bureau responsible for assuring that users understand the system. The department feels a need to educate users and to familiarize itself with such problems as the emergence of personal computers.

"There are lots of problems working with decentralized systems and personal computers, but we can't stop them from coming," he noted.

Cowan blamed some of those problems on the prevailing vendor-driven environment, adding, "I have yet to see a word processor that does what I want it to do." That situation has developed in part because users do not fully understand the nature of their own needs, he explained.

The paperless office will be slow in arriving in hospitals, the director claimed, pointing out that 10% of the user population at his company types.

With advance voice recognition systems in the distant future and the current offerings featuring only 2,000 to 3,000 word vocabularies, more immediate answers are needed, he said.

Typewriters Said No Match for WP

KANSAS CITY, Mo. — Word processing can boost productivity over typewriter-based systems by 50% to 400% in certain applications and by 40% to 50% in typesetting applications, attendees at the Syntopican X conference were told here last week.

Over a four-year period, a medium-range WP system costing $15,000 ends up costing $18 per day or $2.25 an hour, claimed Danielle D. Barr, supervisor of information processing at Research Health Services here.

Turning to specific costs that can be eliminated, she referred to the needs for temporary help, outside services, new typesetting equipment and the need to add new clerical workers.

Barr suggested conducting a time study before implementing WP because, she said, secretaries have a tendency to say tasks take longer to perform than they actually do. The time study should run over a week or a month and entail measurement of every typing task.

In addition to analyzing information storage methods, the study should classify the kinds of documents that are prepared.

Statistical and high-revision documents are ideal for word processing. Short or single documents are less suited, she said.

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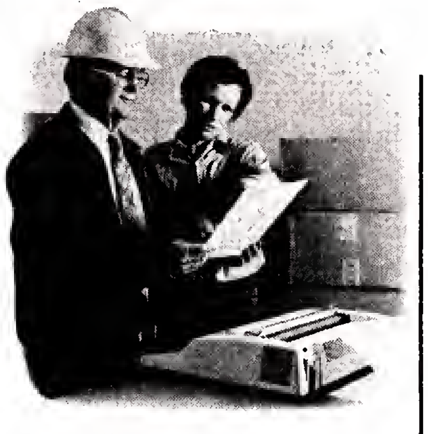

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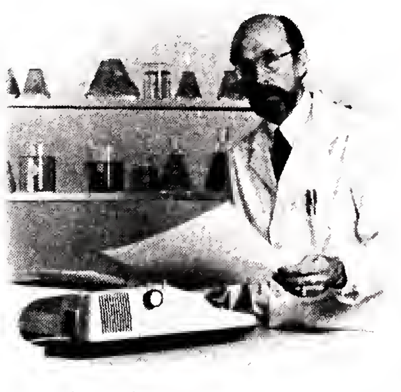

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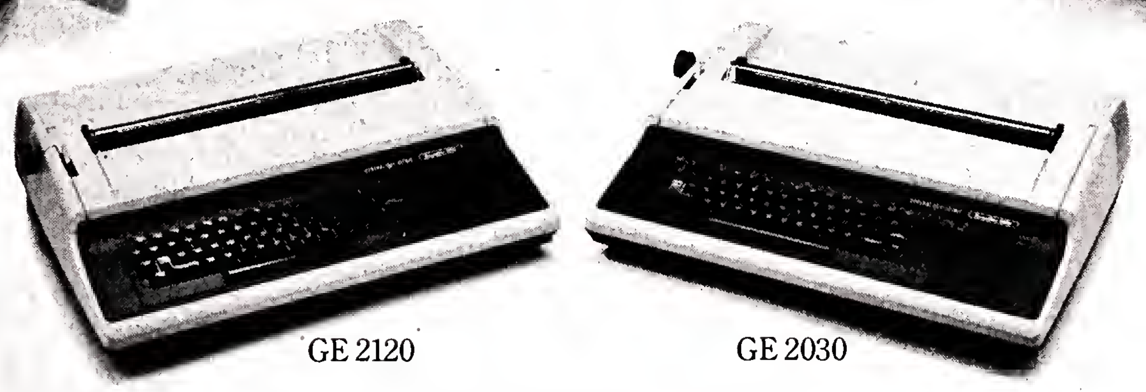

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GENERAL ELECTRIC

Labor Calls for Public Policy on Automation

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — The federal government needs to be more active in developing public policy on issues relating to automation and employment, representatives of organized labor told Congress last week.

Addressing a House of Representatives labor subcommittee hearing on new technologies in the workplace, AFL-CIO representative Dennis Chamot said, "New technology will lead to near-term, localized [employment] problems, at least. What the more distant future holds is anybody's guess. Our government has all but ignored these issues for quite some time."

In contrast, Chamot noted, other countries, most notably Sweden, the UK and West Germany, have studied the problem in depth and have taken numerous steps to soften the impact of automation on the work force through retraining and other labor support programs. "Why has the U.S. shown less concern than those countries?" he asked.

He suggested that "the American approach seems to have involved a great deal of faith in technology itself, in the belief that if we only could develop more and more sophisticated systems, productivity would zoom and all of our problems would evaporate."

Labor's View

Stating that organized labor is not against technology, but is worried about how technology is implemented in the work place, Chamot cited "a great need for training and retraining programs, for protection of salaries and benefits as people are shifted into new positiions, for real improvements in the quality of working life rather than having the machines dominate the work environment."

The AFL-CIO executive said what is needed is a joint effort by government, business and labor to address the many issues raised by automation of the work place.

Chamot's argument was echoed by William E. Bittle, an economist with the International Association of Machinists and Aerospace Workers, whose statement to the House subcommitee Wednesday called for a cooperative program, which would include the scientific community, to develop "social policies designed to make working people the beneficiaries rather than the victims of new technology."

Bittle further said that "workers must seek to obtain some control over new technology."

He noted that his organization has developed a "New Technology Bill of Rights," which he summarized in three declarations: "New technology must be used in a way that creates and maintains jobs; new technology must be used to improve the conditions of work; and new tecnology must be used to develop the industrial base and improve the environment."

Subcommittee Chairman Rep. George Miller (D-Calif.), while not specifically endorsing the labor representatives' recommendations, did agree there has been to this point "a very superficial involvement by the government in this issue."

Major Questions Ignored

"Today," Miller said, "neither the Congress nor the administration has directed adequate attention toward the major policy questions related to new technology in the workplace: computer automation and robotry, education, job training, the effects of tax incentives, the impact of women workers, occupational health concerns, income and retirement policies and job security."

Miller indicated that last week's hearing was the first of a series to be held to consider these and related issues.

The subcommitee was told last week by Congress' General Accounting Office that "no one knows" the long-term impact of automation on employment in the U.S. and that the Labor Department's already meager resources for tracking this issue are being cut because of budget restrictions.

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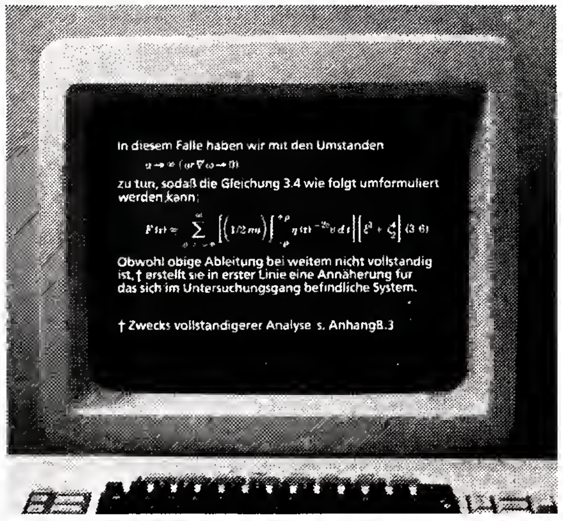
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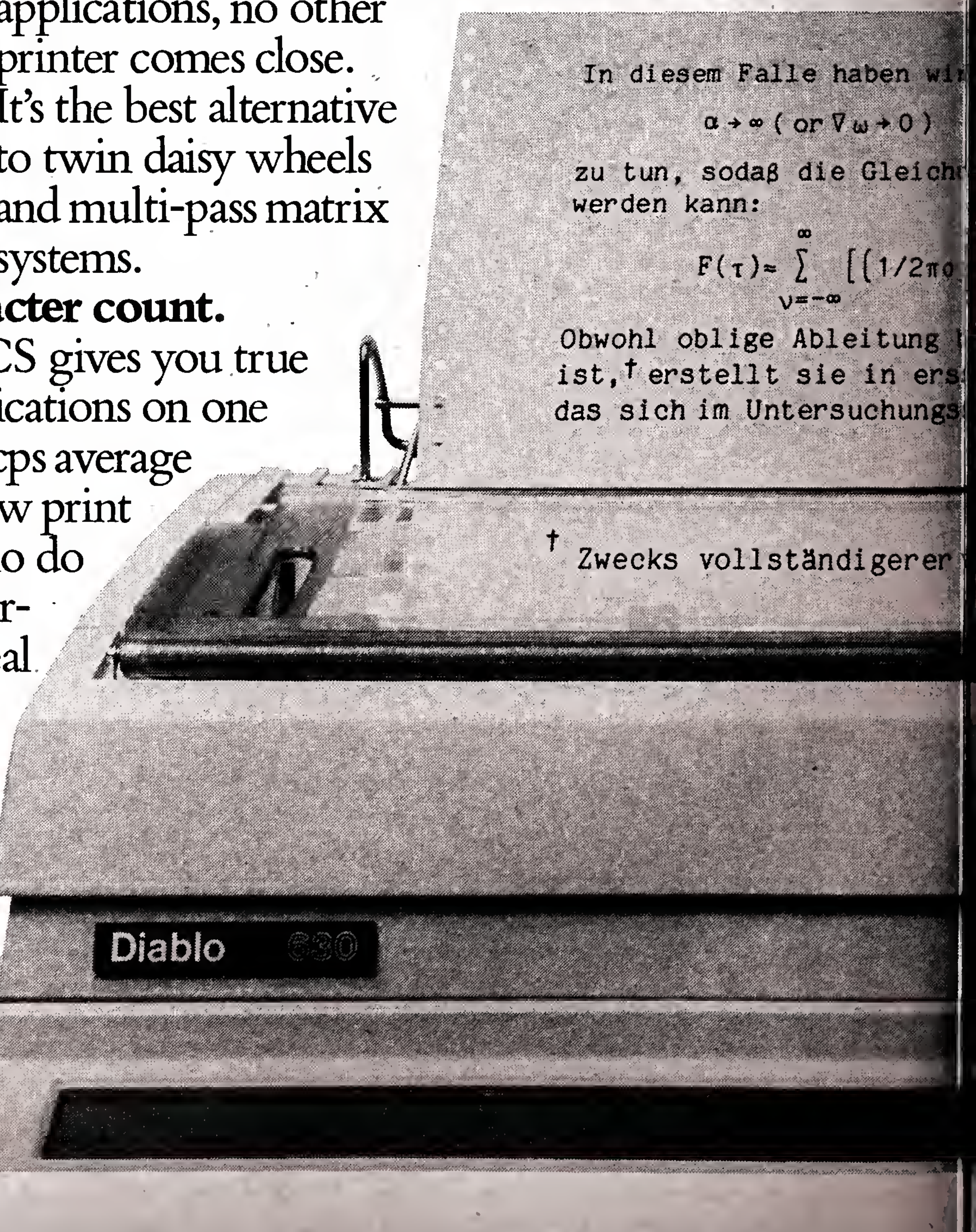
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GAO Says Automation's Effect Unpredictable

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — The long-term effects of automation on U.S. employment cannot be reliably predicted using current information, congressional researchers recently concluded after an in-depth study on the subject.

"Whether automation will increase unemployment in the long run is not known," the General Accounting Office (GAO) reported late last month. The little reliable information on electronics and unemployment that does exist shows only that "short-run job displacement is taking place now," the report said.

Noting the increasing use of electronics in all economic sectors, the congressional agency said that it contacted dozens of major trade unions, trade associations, educational institutions, federal agencies and several computer manufacturers — including IBM, Texas Instruments, Inc. and Wang Laboratories — and reviewed a 1,500 document data base on job loss through automation.

GAO said that it could conclude only that "although automation undoubtedly will cause some loss of jobs in the short run, much debate arises over whether it will cause a long-term increase in unemployment overall or whether more jobs will be created because of it."

The report blamed the prediction difficulties on several factors including a lack of knowledge about the rate of future technology assimilation, the complexities of the issues affecting unemployment and the lack of comprehensive data on the net change in unemployment that has [already] occurred because of automation.

"Without specific hard data, and considering the complexities of the issue, a definite conclusion cannot be reached," the GAO said. GAO did note that the Labor Department's Bureau of Labor Statistics (BLS) expects automation to increase jobs in almost as many different occupations as it is likely to reduce jobs and claims electronics has historically had the net effect of increasing U.S. employment overall [CW, Nov. 2, 1981].

BLS has also identified several dozen occupational categories that will grow because of automation and found that even in the several dozen other identifiable categories expected to be adversely affected by automation, most of the latter will grow anyway [CW, June 7].

Unions Negotiate

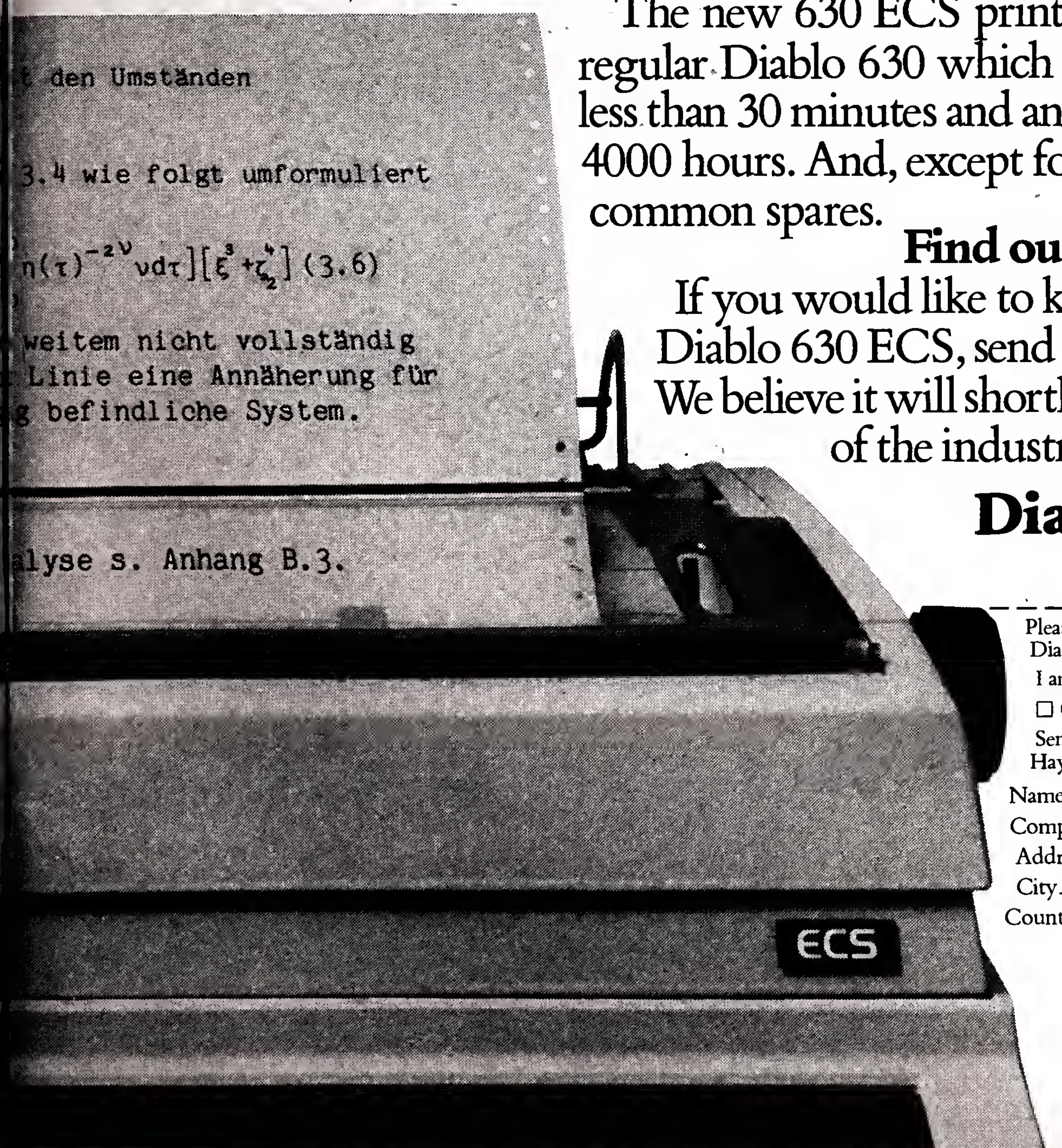
Of those occupations expected to be hurt by automation, GAO pointed out that there are wide variances in pay levels, ages and skills, which, the report said, complicates any accurate forecasting of even short-term job displacement impact.

The study further noted trade units are trying to ameliorate the effects of increasing automation by negotiating contracts that include clauses guaranteeing employment or job retraining or severance pay for those laid off, as well as advance notice of the implementation of new technologies in the work place.

Government agencies, for their part, finance various training programs and provide unemployment benefits for those who might lose their jobs through automation. But the GAO warned that "if a noticeable trend toward increased occupational impact occurs, existing mechanisms for assisting the unemployed may need to be reassessed."

The possibility of increased adverse effects of automation was what prompted the study which said the subject calls for greater public and private awareness of the many related issues. The study noted that this subject has long been controversial and also pointed out that earlier studies predicting automation would not raise unemployment levels have been proved correct.

The GAO said, however, that the increased use of microelectronics since the mid-70s has stimulated even greater automation in the U.S., making past experiences unreliable for predicting the future.



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Bit-Map Version of 3279 Color Terminal 'Definitely on Its Way," Machover Says

By Jeffry Beeler
CW West Coast Bureau

ANAHEIM, Calif. — IBM someday will announce a bit-map version of its Model 3279 color graphics display terminal, according to Machover Associates, Inc. founder Carl Machover.

"I don't have any inside information about the new terminal, and I have no idea when it will be introduced," Machover said at the recent National Computer Graphics Association conference here. "But from a leap of the imagination, I think you can see that a bit-mapped 3279 is definitely on its way."

The revised terminal will reportedly offer many of the same features as IBM's existing 3279, but will consume many fewer machine cycles than the current unit, which was introduced in late 1979 as a character-oriented product.

Although its performance advantages are many, the original 3279 suffers from at least one significant drawback: Its method of creating color-graphics displays is relatively inefficient and places a heavy burden on available systems resources, Machover said.

"Anyone who has ever used a 3279 knows how few of the devices are needed to bring a mainframe to its knees," Machover said. "Of course, it has never been part of IBM's strategy to reduce the demand for CPU cycles."

Machover predicted the eventual "demise" of character-oriented terminals like the current 3279. Although the price of such display units continues to decline, the rate of decrease is still too small to justify the terminals' huge demand for processing power.

Bit maps, by contrast, are dropping rapidly in price. They are declining so fast, in fact, that hardware vendors are increasingly tempted to produce bit-map-oriented terminals that can do alphanumerics and graphics at the same time.

Digital Equipment Corp., for example, recently announced its intention to eventually cease production of terminals that are exclusively alphanumeric. Instead, Machover explained, the company intends to make sure that all its future terminals have a display capability of which alphanumerics is merely one part.

In other comments, Machover urged his listeners to focus their professional attention on the task of "extending [graphics] technology to the nontechnologist."

IBM Discounts Volume 3270s

RYE, N.Y. — IBM is offering a 15% volume discount option on its 3270 series of CRT terminals, allowing users to take advantage of accrued lease purchase credits earlier in a lease term.

IBM has traditionally offered up to a 50% discount on most leased hardware. Discount credits are earned over time. While that policy still exists, the volume discount plan permits users to reach the 50% maximum discount much earlier in the lease.

For example, IBM said, if a user is at a 35% accrual level and buys enough 3270 series units, it can receive the full 50% discount.

The 15% discount is calculated on each installed unit and subtracted from the total purchase price. To qualify for the discount, users must purchase 25 or more 3274/3276, 3287 or 3268 terminals or 100 or more 3278 or 3279 terminals, IBM said.

The volume discount applies only up to the 50% limit, a spokesman said.

APDU Conference Set for Oct. 14-15

WASHINGTON, D.C — The Association of Public Data Users (APDU) will hold its 1982 annual conference here October 14-15.

The conference will open with a panel discussion on several key federal statistical programs. The entire program on Oct. 15 will be devoted to the 1980 census.

The conference registration fee is $95 for APDU members and $175 for nonmembers before Sept. 15. After that, both fees go up $20.

More information is available from Rick Bender, APDU Secretariat, Princeton University Computer Center, 87 Prospect Ave., Princeton, N.J. 08544.

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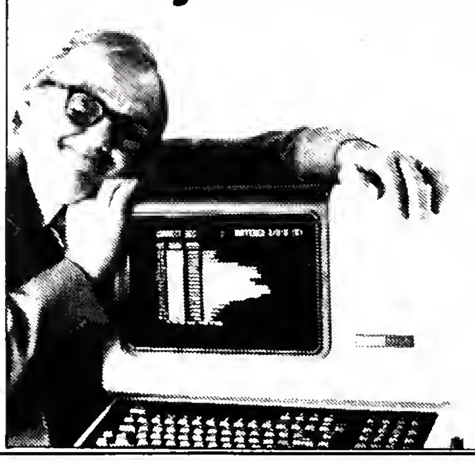

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I'd like more information about the 1982 APL Users Meeting, Toronto, Canada. October 4-6.

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Two-Dimensional Graphs Show User-DPer Agreement

By Brad Schultz
CW New York Bureau

CAMBRIDGE, Mass. — MIT's Sloan School of Management's Center for Information Systems Research's (CISR) Dr. Robert Alloway and Judith Quillard depicted strong agreement between end users and systems professionals in two graphs.

One graph plotted end-user ratings of systems performance against systems professionals' ratings of systems performance. The graph's horizontal axis represented end-user ratings; the vertical axis represented systems professionals' ratings.

Both axes were seven-point scales. For each of the 26 criteria, Alloway and Quillard found the point on the horizontal scale that marked the average of numerical ratings cast by end users and (in theory) drew a vertical line from that point to the top of the graph. Next, they found the point on the vertical scale that marked the average of ratings cast by systems professionals. And (in theory) they drew a horizontal line from that point to the right side of the graph.

The letter of the English alphabet representing each criterion was printed on the graph at the intersection of these vertical and horizontal lines. Alloway and Quillard discovered a clear pattern to the locations of letters they placed on the perfor-

(Continued on Page 20)

CISR Technique Helps Spot Resource Reallocation Needs

By Brad Schultz
CW New York Bureau

CAMBRIDGE, Mass. — A technique designed to help systems managers spot the need for reallocation of the resources backing specific systems operations was recommended here recently by a management scientist.

First, ask end users to rate how well systems professionals have met predefined criteria for successful service, Dr. Robert Alloway advised about 200 systems managers at the annual seminar in which research results are reported by MIT's Sloan School of Management's Center for Information Systems Research (CISR).

Next, ask end users to rate how important each criterion is, and then ask systems professionals the same questions and derive statistical correlations between those responses and the end-user reactions, he said.

From the correlations, Alloway noted, it should be easy for a systems manager to judge how service to end users can be improved by the diversion of resources from operations that either have more than enough backing to keep end users satisfied or are irrelevant to end users, to operations that have not satisifed end users even though they consider them important.

Last Year's Seminar

At last year's CISR seminar, Alloway and Judith A. Quillard, CISR's assistant director, conveyed general conclusions about relations between end users and systems departments that were based on their application of this survey technique to 19 U.S. companies [CW, April 13, 1981].

Alloway told this year's seminar that internal application of the technique by a single company can show which of the following conditions is true of particular systems operations:

- The operations waste resources because end-user satisfaction would not be seriously compromised if backing were diminished.
- The operations are a success because they are very critical to end users and have excellent backing.
- The operations are merely "OK" because end users would not care much if the degree of backing were altered one way or the other.
- The operations are "killers" because they are very critical to end users, yet have poor backing.

Once these determinations are made about each of a systems department's myriad projects and activities, systems managers bent on improving service to end users face the task of diverting resources from the wasteful operations to the killers, Alloway declared.

List of 26 Criteria

The technique developed by Alloway and Quillard entails drawing up an arbitrary list of 26 criteria for successful service to end users. Why 26? That many (or fewer) criteria allows each criterion to be exclusively represented by a letter in the English alphabet, Alloway explained.

In the surveys applied to end users and systems professionals as distinct groups, respondents are asked to subjectively rate how important each criterion is on a seven-point scale. Further, respondents are asked to rate, on another seven-point scale, how well each criterion is handled by the systems department.

From their study of 19 companies (all manufacturers with gross annual revenues that ranged from less than $100 million to more than $5 billion), Alloway and Quillard found strong agreement in each company between end users and systems professionals on how well each of 26 criteria for success was met by the systems department.

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IBMer Advises Separating Data, Voice in PBX

By Phil Hirsch
CW Washington Bureau

PHILADELPHIA — Although the integration of voice and data traffic before they enter the private branch exchange (PBX) is drawing interest, it may be more cost-effective to keep voice and data separate until they reach the interface to the telephone network, an IBM official suggested here recently at a communications conference sponsored by the Institute of Electrical and Electronics Engineers.

"It is in the area of intersystem communications that integration of voice and data may prove very attractive, said George Abbott, IBM's manager of telecommunications products systems design and architecture. He added that integration within the PBX or at the user's terminal — the two most common locations in presently offered voice/data PBX systems — has a number of disadvantages.

Since "traditional telephone practice [provides] sufficient facilities to carry busy-hour traffic with a small probability of delay, this implies that during off-busy hour periods, there will be surplus capacity. In addition, during each voice connection there are substantial idle periods amounting to about 50% unused capacity." By integrating voice and data message streams on the trunk side of the PBX, he added, this spare capacity can be utilized to transmit data.

The efficiency of such an integrated arrangement can be enhanced, said Abbott, if it includes the capability to digitize voice signals at less than 64K bit/sec, the current standard, and if it also packetizes the data to facilitate transmission during long and short periods of trunk availability.

Integrating Voice and Data

Integrating voice and data at the telephone terminal seems attractive at first glance, since it can allow a single, already-installed twisted pair to carry both signals to the PBX. But, Abbott said, the advantages tend to be outweighed by the disadvantages.

While some digital PBXs allow use of a common wire pair between the user's termination and the line interface port, they frequently require a separate codec (voice digitizer) in each terminal, which adds to systems cost, Abbott pointed out. An alternative is to leave the voice in analog form until it reaches the PBX, meanwhile using frequency-separated subchannels on the twisted pair to transmit voice and data simultaneously. This is a relatively inexpensive transmission scheme, but it requires separate line interface ports at the PBX, together with black boxes at either end of the twisted pair circuit link, he explained.

Still another approach, favored by AT&T, utilizes a modem-like device, called a Network Circuit Terminating Equipment (NCTE), at either end of a twisted pair. Data can then be transmitted simultaneously in both directions at speeds up to 64K bit/sec. But the NCTE approach employs proprietary components and requires data and voice to be transmitted alternately rather than simultaneously.

He also indicated that using a common switching matrix to process voice and data messages would not be a good idea.

In this case, the basic problem is that the two types of communications traffic impose different requirements on the switch. Typical holding times for data calls may be much shorter, or longer, than those involving voice communication, Abbott pointed out. PBXs with nonblocking switch capability — the ability to process all incoming calls immediately even when all ports are in use — will be able to deal with the long holding time problem, but a high volume of short-duration calls will require switches with extremely fast call setup/termination times.

Use of a separate system, such as a cable-based local-area network — is probably a more cost-effective way of meeting such requirements, Abbott said. Another reason for employing separate switches is that "terminals do not talk to telephones, so it is not required, unless attractive for other reasons, to serve both voice and data on the same switching network."

Graphs Show User/DP Accord

(Continued from Page 18)

mance graph in this manner.

None of the 26 letters were located near the graph's upper left corner. Any letter placed in that region would have demonstrated that, for a particular success criterion, systems professionals had seriously overrated their service to end users.

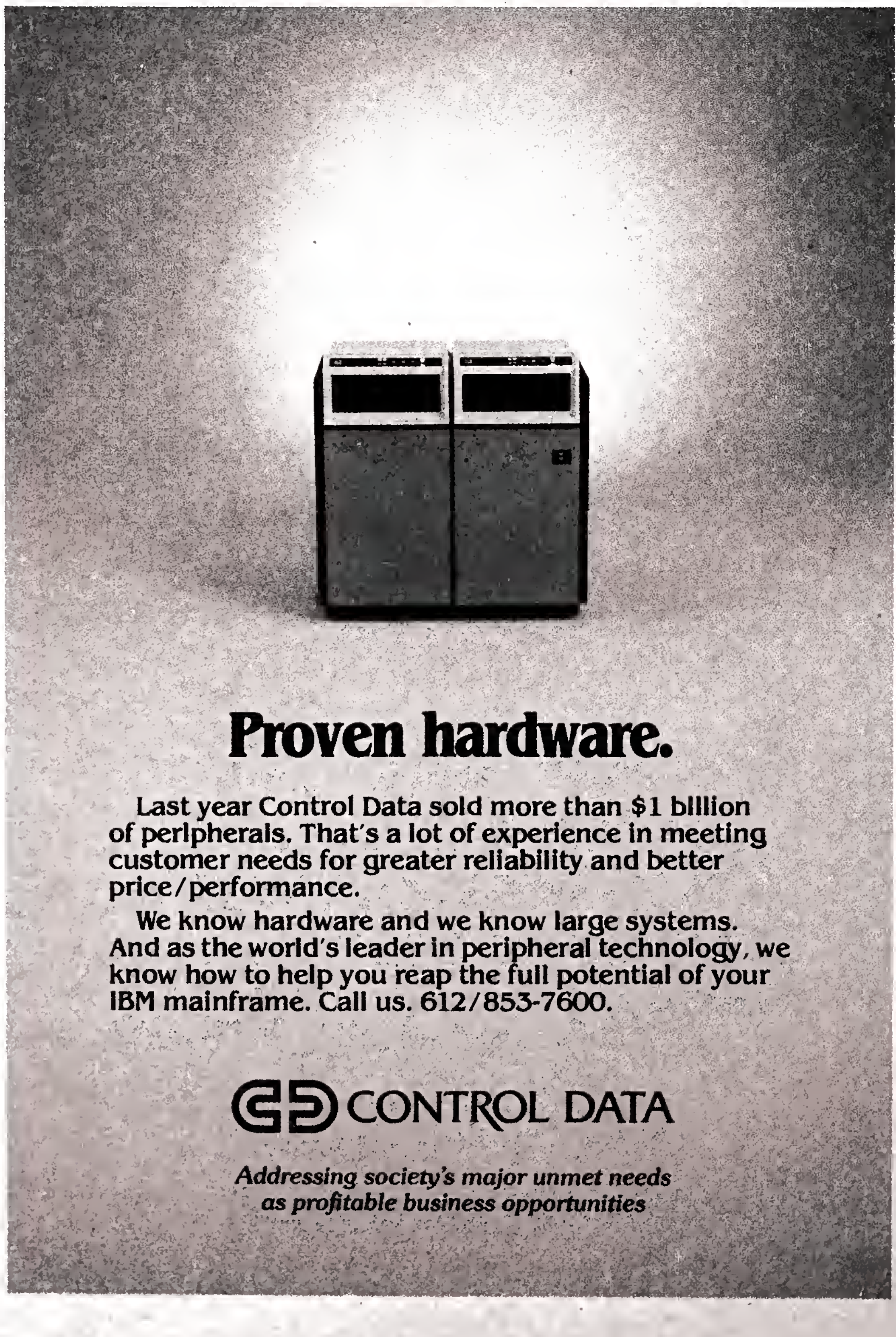
Nor were any of the letters located near the graph's lower right corner. Any letter placed in that region would have demonstrated that, for a particular success criterion, systems professionals seriously underrated their service.

A narrow strip running diagonally from the graph's lower left corner to its upper right corner contained all 26 letters, demonstrating agreement among systems professionals and end users.

A second graph plotted end-user ratings of importance against systems professionals' rating of performance.

But when Alloway and Quillard plotted end-user ratings of performance against end-user ratings of importance for each of the 26 criteria, the researchers wound up with letters spread helter-skelter about the graph.

These latter two graphs showed that both groups of survey respondents believe important success criteria have not elicited high performance from the systems department.



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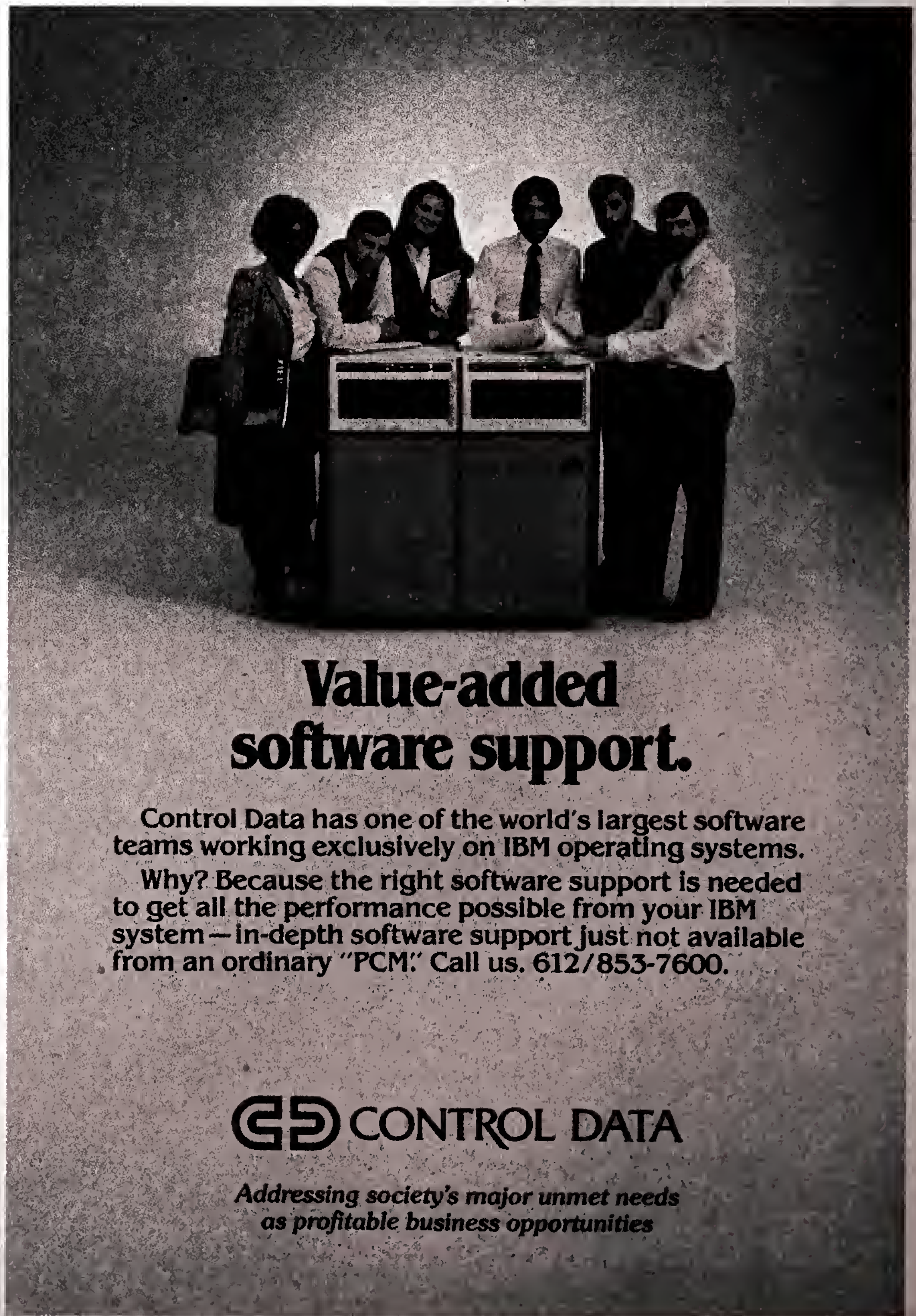

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DSDC Applications

AT&T Discloses More Details of ISDN

By Phil Hirsch
CW Washington Bureau

PHILADELPHIA — AT&T disclosed a few more details of its nascent Integrated Services Digital Network at a communications conference that met here recently under the auspices of the Institute of Electrical and Electronics Engineers (IEEE).

In a paper titled "Direct Services Dialing Capability: A New Network Capability," AT&T's Daniel Sheinbein explained how computer mediation can automatically process calls in any of several ways. Although initially the new capability is being utilized only to handle voice calls, data communications applications are likely to follow.

The key elements of Direct Services Dialing Capability (DSDC) are a set of customer-specified call-handling instructions and "primitives" — software subroutines that carry out the instructions. The former are stored within "network control points" (NCP), while the primitives are contained within "action points"(ACP).

The first application of DSDC is AT&T's recently announced "Extended 800 Service," which allows an In-Wats customer to have calls routed automatically to any of a number of locations depending on time of day and/or location of the calling party.

To invoke DSDC service, Sheinbein explained at the IEEE conference, the caller dials a number containing 10 or more digits. The first three describe the specific services — 800 for In-Wats. The remaining digits identify a file in the NCP containing the customer's call-handling instructions. Initially, the 10-digit code goes to the ACP — a computerized facility located within or adjacent to a telephone switching center. The ACP then relays the dialed digits to the NCP node, which consists essentially of an on-line data base. The code represented by the digits indicates which NCP has the customer's call-handling instructions.

Next, the NCP transmits a code containing the instructions to the ACP, and this action triggers the related subroutines, resident at the ACP, that are needed to carry out the instructions. In the case of Extended 800 Service, for example, the NCP would transmit the phone number of the office to which an incoming 800 call from a specified area code should be directed, and the ACP primitive would then set up the connection.

Aside from call routing, Sheinbein explained, the ACP repertoire includes several billing options enabling the caller and customer to split the call charges. Also, Touch-Tone digits can be collected at the ACP, the facility can generate recorded announcements and incoming calls can be handed off in any of several ways.

He did not explain how these latter capabilities might be used. But from what AT&T officials have said at other IEEE conferences, it is clear that DSDC has at least the potential of developing into a major on-line interactive information system.

Through the use of Touch-Tone input pulses and recorded voice messages, for example, DSDC could support telephone terminal-based teleshopping services. By referring incoming callers automatically to prestored messages, the system could provide electronic mail service. Prestored text messages might also be supplied to "smart telephones" like those that Tymnet, Inc. and Northern Telecom, Inc. have introduced, while graphics could be delivered to TV sets with videotex decoders.

DSDC capabilities, as described by Sheinbein, related only to the analog telephone network, but they may well be applied to the digital services AT&T plans to unveil during the next few years. This was indicated by another paper presented at the IEEE conference.

Authored by F.C. Kelcourse and E.H. Siegel of Bell Laboratories, it observed that "As SDC [switched digital capability] penetrates further, the potential uses of "Pots-like" [Plain Old Telephone Service] digital data connectivity will become limited primarily by the imagination and by the availability of suitable customer-premise terminal equipment . . ."

'Cost Control Through High Tech' Will Be Theme of Comnet '83

NEW ORLEANS — "Controlling Communication Costs Through High Technology" will be the theme of the Communications Networks Conference, (Comnet '83), slated to take place here next Jan. 21-Feb. 2.

Six separate tracks on network applications will be featured during this event, including "Computerized PBX and Voice Communications," "Local-Area Networks and Internetting," "Electronic Mail/Office Communications," "Modems and Multiplexers," "Minicomputers, Network Processors and Protocol Conversion" and "Personal Communication and Computing."

Four-day registration costs $395; one-day (seminar) costs $295.

Additional information on the conference can be obtained from Communications Networks, located at P.O. Box 880, Framingham, Mass. 01701.

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Says Doomsday Scenarios Overstated

Afips Finds U.S. Not Vulnerable in DP Disasters

By Jake Kirchner
CW Washington Bureau

HOUSTON — Despite increasing dependence on computers, American society is not imminently threatened by systems vulnerabilities, a recently completed study by the American Foundation of Information Processing Societies (Afips) has found.

According to Prof. Rein Turn of the California State University Computer Science Department, Northridge, Calif., the doomsday vulnerability scenarios worrying many Western European nations, particularly Sweden, are either overstated or do not apply to the U.S.

Turn noted at a recent National Computer Conference session here that a 1979 Swedish government report found "vulnerability is unacceptably high in today's [Swedish] computerized society." According to Turn, Afips decided to examine whether that conclusion is warranted for the U.S.

The organization brought together Turn and other noted analysts of DP's social impact, including fellow panelists David Brandin, SRI International executive and president-elect of the Association for Computing Machinery, Dr. Willis Ware, Rand Corp., Donn Parker, SRI International, and Dr. Edgar Sibley, former University of Maryland computer science professor, now executive vice-president of Alpha Omega Group, Inc., Silver Spring, Md.

Study Results

The Afips study concluded that the developing U.S. information society is very resilient and, at least for the present, impervious to attacks against its systems, according to the panelists, who said they were unable to discern any basis for arguments that the U.S. could be crippled by vital systems or groups of systems being brought down by failures, natural disasters or terrorist atacks. The study did not include war scenarios because, Turn explained, they would be too complex for the informal examination of the Afips group.

"Vulnerabilities obviously exist; we'll stipulate that right off the top," Ware said. He added that the group found it impossible to imagine a scenario of "massive large-scale disasters . . . that would bring down [systems] like a row of dominoes."

Even in "our information addicted society," Brandin said, it is unlikely an attack on systems would bring them "crashing down into a great Gotterdammerung." Brandin said that after examining the vulnerability question, the group concluded "we just don't know where the threats are and when people point at [supposed] threats we just can't believe they produce believable catastrophic scenarios."

Why is the U.S. information society so resilient? According to Ware, "resiliency is an implicit, by-chance phenomenon" due largely to the people who are part of all DP/telecommunications systems. Also, he said, in "information systems as they are embedded in their real-world context" there is "a diffusion of authority" and lack of concentration.

The people who keep systems running, he explained, have an intuition about transactions that makes systems relatively immune from secret attacks and the experience to know how to restore systems and recover data after even large-scale failures.

If this is indeed the reason for resiliency, Ware continued, "as we move to more automated clusters we may lose something that we didn't realize we had lost." Systems designers need more insight into how this resiliency works so they can make it a design goal and build it into systems "as a deliberate thing rather than as a casual thing as it now exists," he said.

Turn noted the hallmark of resiliency in the U.S. is system redundancy. The country is so large and the systems so widespread that there is an inherent redundancy that small countries do not enjoy. According to Sibley, European nations would not have a vulnerability problem "if they were truly united."

Brandin asserted some European concerns are "wishful thinking on this topic — more fantasy than reality."

Maginot Line Syndrome

But the panelists agreed the U.S. must not become complacent about vulnerability and must ensure continued resiliency as society becomes more and more automated. Now, according to Parker, "there is resiliency based on actual experience." People remove vulnerabilities as they are identified, which leaves the U.S. with what Parker called "the Maginot Line syndrome — the bad guys are going to attack us where we don't have controls" and safeguards.

"This requires vigilance," Parker said, and some form of "continuous observation" through a mechanism to examine vulnerabilities as they arise and to consider ways to deal with them. Brandin suggested Afips would be a logical organization that establishes "a permanent resiliency monitoring function."

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LS-120 AA (120 CPS)	995	795
LA-36 DK	950	595
VT-52	1,295	—
LA-180	695	475
LA-34 DA	795	—
VT-100	1,395	995
VT-101	925	—
VT-131	1,430	—
TELEVIDEO		
950	$885	$ —
912B	655	—
920C	—	495
LEAR SIEGLER		
ADM-3A	$575	$395
ADM-5	625	450
DIABLO		
1620-1	$ —	$1,395
1640-1	—	1,495
1641-1	—	1,450
1650-1	2,670	2,195
Xerox 1750-1	2,870	—
1860-1	—	595
DTC 300 (Same as 1620)	—	595

DEC SYSTEMS

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11/23 AB 128KB 110/240V	$4,950
11/24 BD 256KB 110/240V	9,950
11/34A-YF 256KB	12,500
D315A-RZ	6,500

PERIPHERALS

TECHTRAN	NEW	USED
818	$1,255	$ —
6400	1,095	395
6420	1,200	550
8421	1,250	595
950	1,195	—
615	—	295

MODEMS & COUPLERS

VENTEL		
120	$ 75	$ —
103	—	100
1212	450	—
ANDERSON-JACOBSON		
1245	$ —	$395
242-36	225	100
243	225	100
242-A	250	125
ADAC 1200	450	350
1258	—	695
AJ 1255 (Vadic 3455)	595	—

DEC OPTIONS

4K Buffer for LA-120	$225	—
APL for LA-120	85	—
Forms Control for LS-120 (Min. 5)	75	—
20 Ma I/F for LA-34	60	—
Ext. Logic for LA-34	100	—
Interfaces for LA-180	200	—

MISC. TERMINALS

Hazeltine 1400	$ 675	—
Hazeltine Model 1	1,595	—
Informer D 304	1,250	—
Okidata SL 250	2,950	—
Teletype 43 AAA	695	595
GE 2120 KSR	1,450	—
GE 2030 KSR	825	—

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In addition to this feature, you'll see several articles on current happenings in all aspects of OA. All-in-all, a great follow-up to the first issue of *Computerworld OA.*

So, watch for the next issue of *Computerworld OA* on June 23rd.

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Four Vendors Offer Technology War Stories

By Tom Henkel
CW Staff

HOUSTON — Problems resulting from impractical system designers or poor system documentation are not limited to end-user environments.

Four systems vendors offered their own views on the advantages and pitfalls of walking the technology tightrope during a session of a recent conference here.

All four developers were involved with developing object-oriented systems; however, their successes, and failures, were quite different.

Perhaps the most famous problem story involved IBM's System/38. Scheduled for first deliveries in mid-1979, IBM was forced to delay delivery of the system because of reported software problems. Glen Henry, former manager of program development for System/38 and currently manager of information systems at IBM's Austin, Texas, manufacturing facility, said it took about six months to design System/38, three years to sell it to IBM management and four years to build it.

IBM wanted a system that would offer a migration path from IBM's System/3, System/32 and System/34 processors. The end result was a system that is an innovative system which is not ideally compatible with any of those systems, Henry said.

When the System/38 project started in 1975, IBM officials wanted a relational data base, interactivity and easy-to-use program development tools. The problem was that IBM insisted on maintaining some compatibility with RPG and Cobol, the basis of what was then the General Systems Division's product line.

To achieve that goal, IBM instituted a new company policy: Development was to be carried out by a team of IBMers, many of whom were to be hired from master's degree programs in various universities. Software for the System/38 was to be designed from the ground up, Henry recalled.

However, those master's degree candidates did not know how to design a system that contained more than a million lines of software and microcode. The result was that software for the system lagged behind actual system development, according to Henry.

When the software was finally developed, IBM discovered a more serious compatibility problem than originally expected — one that still remains a complaint among System/38 users today, Henry said.

VAX Story

Digital Equipment Corp. offered some history on the VAX line of processors, which began as an enhancement to its smaller PDP line of minicomputers.

In 1975, PDP series users complained they were outgrowing their systems and wanted a larger migration path. DEC toyed with the idea of simply doubling the address space in the PDP-11, thus creating a 32-bit processor. That plan was rejected on the assumption that such an architecture change would create more problems than solutions, according to Dileep Bhandarkar, one of the developers of the VAX processor.

DEC viewed the VAX line in two ways, one from a practicality standpoint, which eliminated some architectural concepts such as a stack design, and another from an economic standpoint, Bhandarkar said.

DEC wanted a machine that would support a large virtual address space, support high-level languages and provide an expansion potential. The system also had to be compatible with the PDP-11's RSX-11 operating system, Bhandarkar said.

Documentation was the stumbling block that faced Intel Corp. when it introduced its 432 microprocessor. Justin Rattner, manager of the VLSI Architecture Group at Intel said the firm decided to announce the 432 several months before the product was actually complete. The biggest problem was a large backlog of documentation brought on by a separation of technical people.

Apollo Computer, Inc., manufacturer of distributed nodal processors that incorporate the firm's Domain local-area network was restricted by a decision to keep its processors compatible with the Fortran programming language. That constraint made it impossible to include some potential advancements in the system.

Deltak Offering Courses on SNA

OAK BROOK, Ill. — Considerations on whether to implement IBM's System Network Architecture (SNA) are explored in a video training series developed here recently by Deltak, Inc.

The series includes "SNA: Management Considerations," "Principles of SNA," "Components of SNA," and "SNA Implementation and Operation Considerations," featuring industry pundits James Martin and Dixon Doll. This program was designed for managers, users and professionals involved in SNA installations, according to Deltak.

The learning series is available for purchase or rental through Deltak's Advanced Technology Library. Prices vary depending upon programs, ranging from approximately $50/mo to $125/mo per course.

Deltak is located at 1220 Kensington Road, Oak Brook, Ill. 60521. . .

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Technology Is Here Today

Future OA Communications Links 'Inevitable'

By Bruce Hoard
CW Staff

HOUSTON — Although the technology needed to interconnect automated offices has been around for many years, that interconnection is only now beginning to happen, according to John McQuillan, president of BBN Computer Corp.

Speaking at a recent conference here, McQuillan said that standardized communications links between offices will give office automation more value while decreasing operation costs and risks. He said standard office communications links are "inevitable," just as standardization was within past technologies.

"It's now becoming a commercial reality, both nationally and internationally," he observed.

McQuillan stressed the importance of designing automated offices with communications networks in mind and vice versa, especially when considering computer-based messaging services (CBMS). He defined CBMS as being based on a computer with electronic mailboxes assigned to users. "CBMS technology and network technology are very synergistic," he said.

As an example of that synergy, he noted how basic communication transport services such as X.25 protocols are incomplete without user services like CBMS. The X.25 service moves data while electronic mail creates, stores, files and retrieves it.

The packet-switching-based Arpanet, developed by the U.S. Defense Department in the late 1960s and maintained by BBN, characterizes the complementary nature of transport and user services better than any other network, McQuillan claimed.

In daily use by 10,000 people and using more than 200 computers nationwide, it features 12 different electronic mail systems. "An incredible potpourri of services," he called it..

Although Arpanet can be used for very advanced interactive resource sharing, McQuillan said its primary use has been as a message system for the scientific community.

He traced the history of electronic mail back to the telegraph and noted how each succeeding electronic mail generation has been easier to use in the same fashion of other communications technologies. Each new user service has spawned a new communications service, he said.

Getting back to Arpanet, McQuillan said that its user and communications services were analogous to postal and office automation services. On the postal service level, Arpanet features system level software and uniform communications across host computers. On the office automation level, software may be applications oriented and diverse across hosts.

He expressed his strong support for work being done by the National Bureau of Standards (NBS) toward protocol standardization for CBMS. "Protocol standardization for CBMS is on the brink of a breakthrough," he declared, adding that six CBMS vendors have announced their support for a nearly complete message format protocol. The six are BBN Computer Corp.; Compute Corp. of America; Dialcom, Inc.; Digital Equipment Corp.; GTE Telenet; and Tymnet, Inc.

"In the end, even if you have different message systems in your organization, it may still be possible to communicate electronically," McQuillan said.

Demand by 1990

Steve Smith of Xerox Corp. described a project he worked on aimed at determining the demand for electronic communications in an unrestrained communications environment by 1990. Based on current communications usage by 5,000 Xerox employees at 24 geographical sites, the study evaluated the quantity and character of the demand. The unrestrained environment he described is one in which all employees have intelligent workstations and unlimited access to electronic communications services.

The study investigated intra- and intersite communications in the following categories:

- Operational or regular data communications.
- Electronic document distribution.
- Electronic message systems.
- Personal computing.
- Telephone voice traffic.

According to Smith, the results showed that electronic document distribution, encompassing facsimile, electronic printing and document file transfer will dominate electronic communications by 1990. He said that the average user will transmit 1.524M bytes of electronic documents daily and that the category will grow by a factor of 18½.

Although the ratio of voice to data communications is 70% to 30% now, he predicted that those figures will be reversed by 1990, noting that the widespread use of digitized voice communications could alter the situation.

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Risk Analyses Said Needed to Determine Technology's Effects

By Marguerite Zientara
CW Staff

HOUSTON — Because of our increasing dependence on automated communications systems — as in large government agencies and air traffic control — the U.S. must start undertaking risk analyses to determine future policies.

The problem is, however, "we don't know how to do low-incidence, high-loss risk analysis," according to Lance Hoffman of George Washington University's Department of Electrical Engineering and Computer Science, who spoke at a session on "Vulnerability of the Computer Society" at the recent National Computer Conference here.

"Low-incidence, high-loss risk analysis is a new area, no one really knows how to do it and there's a lot to be desired in present risk analysis techniques," Hoffman noted. To that statement a member of the audience suggested that at least we can be collecting relevant data for use at a time when the methodologies we need exist.

Why do we need such risk analysis? "Society is becoming increasingly interdependent on computer systems," Hoffman said, noting that it is possible to become an electronic "nonperson" because of the failure of an electronic funds transfer (EFT) system.

Temptation for Abuse

"EFT is a source of temptation for fraud, abuse and sabotage," he noted, asking "Should society be able to end its dependency on a system if its risks outweigh its benefits?" and "Will our increased dependence on such systems increase our vulnerability to terrorists and natural disasters?"

Noting that discussion on the question of vulnerability is "now at the point that privacy discussion was at in 1968," Hoffman said that we must first agree on definitions of terms.

The main issue at hand is "how we can best implement technology for the best societal and economic benefits without causing problems to arise," noted Fred Weingarten, of the Congressional Advisory Group Office of Technology Assessment .

"Normally those who speak of the dangers of a technology are viewed as being antitechnology," Weingarten noted, "but the technologists should not use that as an excuse to avoid the issue and the debate on the vulnerability question."

One area of particular concern is that of electronic mail, observed Willis Ware of the Rand Corp. "It is crucial that we figure out how to protect society's interests in systems available from private offerers," Ware said.

CW Photo by S. Blakeney
Alex Hoffman

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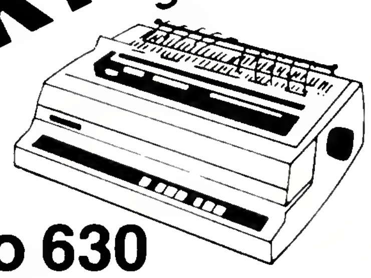

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IMPORTANT GAINS IN PRODUCTIVITY Information systems have been a key to productivity in virtually every business. Net 1 will further improve productivity. It will remove technical barriers preventing integration of these systems.

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Net 1 provides a comprehensive network management service and will evolve to accommodate a variety of additional functions.

A BASIS FOR THE FUTURE You can make AIS/Net 1 service the basis for planning the future information management needs of your business. Soon it will help you solve today's problems and provide solutions for tomorrow.

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In Comparing System Performance

Beware: Benchmark Tests Not Final Word

By Hillel Segal
Special to CW‡

While benchmark tests are one important aspect of comparing the performance and usability of computer systems, they are not intended to serve as the final word.

Every customer must know his own needs and evaluate the availability of all necessary features and software. He should also check the level of support available from the dealer, as well as the credentials, reputation and stability of that firm.

Finally, a customer should not buy without talking to others who already own the same product and preferably have dealt with the same local outlet.

These aspects of the evaluation process are necessary whether or not benchmark results are available. When, as is the case with the systems which have been tested under Association of Computer Users (ACU) sponsorship, published results are available, they provide an additional level of information about the computers' suitability.

Test Results

Over the past year and a half, I have reported on the results of benchmark tests of small and medium-size business computers. In the $25,000 and under price category, all the systems were tested for single-user speed in CPU and disk-intensive operations, plus three application tests: scientific/engineering, new product planning and accounts receivable. All these test results can be directly compared.

In the $50,000 and under price range, multiuser systems were tested for CPU speed as well, and these results are comparable with times in the single-user tests. In addition, the reports cover performance of a multiterminal response time test that was programmed using an order entry application. These results relied on use of a remote terminal emulator, which simulated the action of terminals sending 12-line records of information.

When the ACU undertook its program of testing popular small computers, I realized that other elements of a working computer system are just as important as the speed of operation. And I have always emphasized that the key to correct use of the benchmark comparisons is to couple the interpretation of test results with an understanding of the environment and end users for which each computer was designed.

ACU's main premise, from the beginning, has been that the benchmark results can be important, and should not be left out of consideration. But speed tests alone cannot, and should not, be the overriding factor in the purchase of a computer system. Even more important than sheer speed are the applications software, the programming languages and operating systems desired, the service and training support and documentation.

Did I forget to mention the price? It was not accidental, because I feel that price is sometimes overemphasized by both the media and the manufacturers. Users should be looking at the overall cost of using a system, not just its initial price tag.

Many users tend to get "feature happy," loading up their shopping list with extras that will prove marginally useful in the intended application. But the basics are important. It is important to evaluate the magnitude of the task before considering what type of equipment is needed.

Features such as memory size, disk storage capacity, printer availability and communications capabilities play an important part in narrowing down a selection to fit the specific need.

One important consideration is the ability of the system to interface properly to any devices that already exist in the office environment. Such devices could range from a small terminal or lab instrument to a large mainframe computer. It is vital to ask, "Can the system interact easily with our other computers?"

Generally speaking, it is also best to standardize programming languages as much as possible. Computers not in line with the overall company approach to languages and applications should be treated with caution. They may frustrate efforts to achieve software portability.

As more devices from many different manufacturers become part of the office, it is difficult to assure that communications and programs will be compatible throughout. But it is still a good idea to manage the introduction of new systems carefully from this point of view.

One of the most important things to look for is expandability. Think about whether the system will be able to grow with the firm over the next several years. Three limitations that can become critical are the maximum main memory, the maximum on-line storage capacity (disk drives) and the maximum number of terminals in a multiuser system.

Too often, customers purchase a system that is "perfect" for their needs — but discover that when their volume doubles, the computer cannot maintain the needed records or process the information in a timely manner.

Of course, no system can expand indefinitely. Limitations of one kind or another will stop the growth in total usage of the computer. There is always a realistic limit to the number of terminals in use or the number of records that can be stored. The question then becomes how to replace the entire system without throwing away the investment in software that went with it — not to mention the files and all the typing that went into creating them. When it is time to recycle hardware, the issues of software and data base transferability loom large. If you have to switch manufacturers in order to get a bigger system, these aspects can prove very tricky . . . or troublesome.

One very important area of concern should not be left out of any discussion of computer selection: the personality match between vendor and customer. Whether the system comes from a local dealer, a factory representative or even a mail-order firm (in which case be extra careful) the user has a right to expect prompt attention to any problems that arise.

'Hand Holding' Users

Some computer users expect and need a lot of what the industry terms "hand holding." This customer wants training in the use of the system, a set of usable programs to come with it and prompt on-site service.

That is nice in theory, but many small computer vendors simply are not equipped to offer such support. Their profit margins or style of operation just are not oriented toward it. Often, less expensive systems are sold with minimal help of installation or training offered.

If you are a customer who wants a high level of service, be sure to buy from a source that not only promises service, but also has a proven track record of providing it.

By combining the key areas of features, expandability, compatibility, software and support with the performance evaluations available from benchmark results, one can obtain a complete view of the field.

The effect of each benchmark series is to present as complete a picture as possible of the capabilities and liabilities of the industry's most popular computers in the under-$25,000 and under-$50,000 price ranges. Armed with hard facts and figures from these performance comparisons, computerization decisions can incorporate a realistic measure of the actual speed of operation, along with many other elements that continue to be tremendously important.

SCOREBOX

Summary of 24 Small Computers

System	Price as Tested
Pertec PCC 2000	$12,270
North Star Horizon	6,911
Cromemco System Two	9,275
Texas Instruments 771	12,100
Vector Graphic System B	7,750
Decstation 78	11,570
Radio Shack TRS-80 Model II	7,648
Apple II+	4,270
Digital Microsystems DSC-2	9,085
Ohio Scientific C3-A	10,440
Alpha Micro AM-1011	15,605
Data General CS/10 Model C1	15,500
SD Systems SD-200	12,300
Wang 2200SVP	14,600
Altos ACS8000-15	8,875
NEC Astra 205	9,890
Dynabyte 5300	7,835
Billings BC-12 DF2M	11,395
Smoke Signal Chieftain 9822	8,149
Commodore CBM-8032	4,085
Vector Graphic 3005	11,150
Xerox 820	7,220
IBM Personal Computer	4,550
IBM 5120	(1)

1. no longer offered

Summary of 12 Multiuser Computer Systems

System	One-Terminal Price	Eight-Terminal Price
Wang 2200MVP	$34,500	$53,400
IBM Series/1	52,375	62,795
Texas Instr. DS990/4	32,955	46,355
Hewlett Packard 250	26,650	(1)
DEC Datasystem 355	43,500	57,900
Alpha Micro AM-100T	35,680	42,330
Microdata 4000	37,975	56,000
Data General CS/50	42,785	57,835
Altos ACS8000-10	12,340	(2)
Burroughs B91	28,562	49,359
Ultimate A1	48,145	(3)
Datapoint 8600	38,675	59,545

1. Six-terminal price $37,825
2. Four-terminal price $15,625
3. Seven-terminal price $55,415

This is the 56th and last in the current series of articles giving the highlights of benchmark tests conducted on popular small computer systems. The full reports are available from the Association of Computer Users.

Segal is president of the Association of Computer Users, a nonprofit association with members in the U.S., Canada and several other foreign countries. A package of information about the Association of Computer Users is available from the group at P.O. Box 9003, Boulder, Colo. 80301.

Exec Cites DSS as Invaluable Support — Not Replacement — for Decision Making

By Catherine Marenghi
CW Staff

HOUSTON — The ability to truly look at your business environment and test your assumptions is something on which you can't put a dollar value.

That's how H. Albert Napier, president of Houston-based Systems and Strategies, Inc. and associate professor at the University of Houston, assessed the value of decision support systems (DSS).

Speaking at "A Tutorial for Decision Support Systems," a session at the recent National Computer Conference here, Napier outlined the problems and constraints that business people face today: the volatile economic climate, the cost of doing business, increasing competitive pressures and the burden of government regulation.

"The challenge," Napier asserted, "is to utilize modern information technology to improve the productivity of both the individual and the organization." Specifically, that challenge is to expedite problem solving, improve interpersonal communication, promote learning and training and tighten organizational control.

Comparing DSS to the traditional transaction processing environment, Napier stressed that the focus of DSS is to improve effectiveness, not efficiency. "The philosophy behind DSS is to support, not replace, decision makers," he added.

Napier characterized DSS as flexible and adaptive systems, user-initiated and controlled processing and quick response.

"One of the keys to DSS success is top-management support, involvement and design," Napier pointed out, stressing that DSS design is the top manager's responsibility, not the MIS manager's. Other keys to success include transitional development and implementation, a unified planning system and interaction in the planning and control process.

"A DSS is not just a giant calculator," Napier noted, prefacing his outline of DSS performance objectives:

- Support for unstructured and semistructured decision making.
- Support for all levels of management and integration between management layers.
- Support for all phases of the decision-making process.
- Process-independent and user-controllable systems.
- Support for independent and interdependent decision making, including personal, group and organizational support.
- Ease of use.

Describing the typical system development approach — from feasibility study through analysis, design, development and implementation — Napier noted the problems with having to state in advance what the system requirements might be. "There is no loop in this process," Napier said. "Once the development train gets rolling on its track, you can't make it back up."

However, with the DSS approach, "we say a priori that we don't know what the system requirements are," Napier stressed. The steps in the DSS development approach are as follows:

1. Identify a critical subproblem or problem area.
2. Build an initial system.
3. Use and evaluate the system.
4. Add and delete capabilities.
5. Repeat steps 3 and 4.

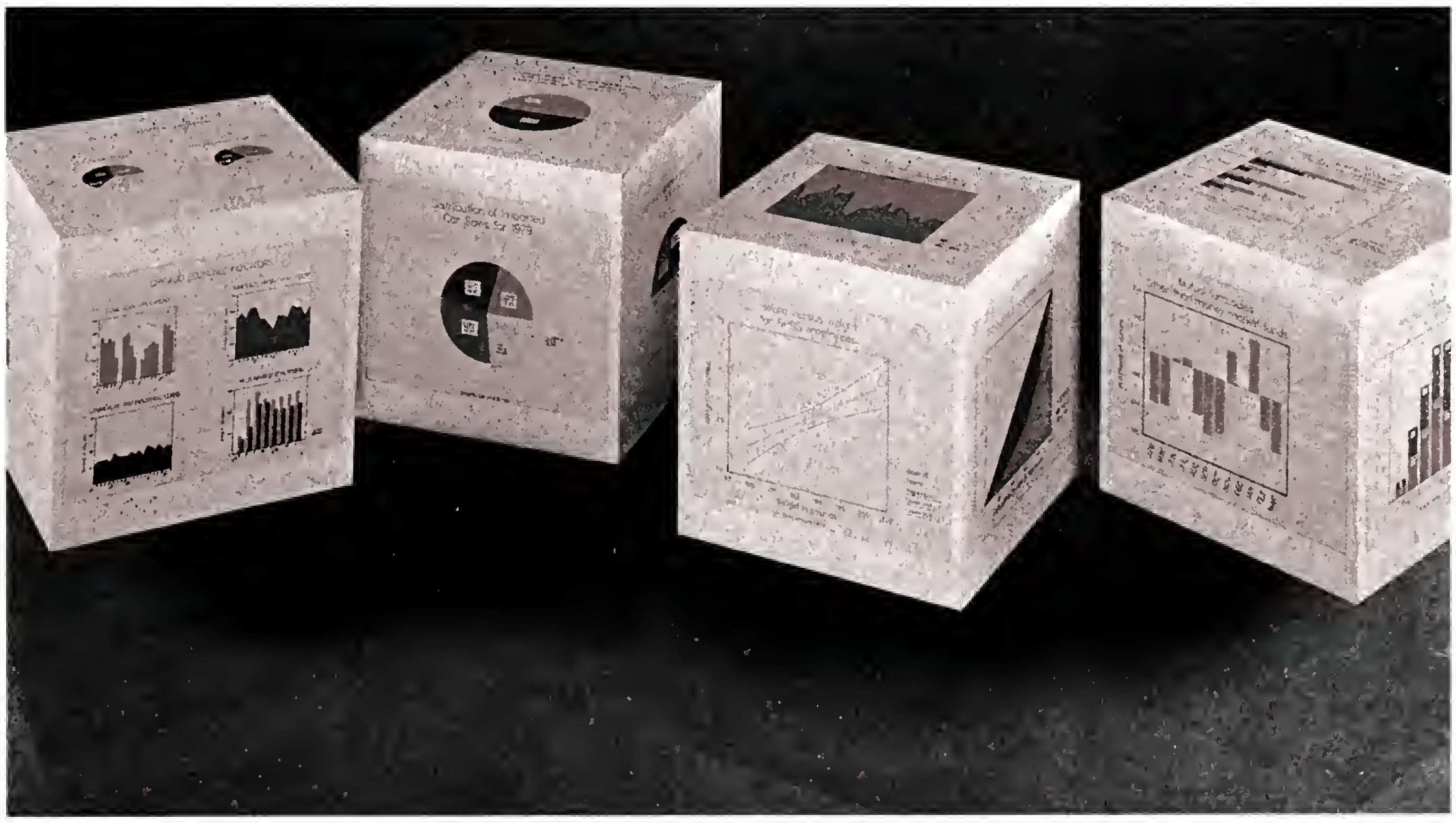
Napier described DSS technology as three tiered: application-specific DSS; DSS generators, for example, software packages like IBM's Gads or Boeing Computer Co.'s EIS; and DSS tools, such as graphics, ad hoc inquiry, what-if analysis, retrieval and so forth.

What is the real value of a DSS? "No one has ever done a cost/benefit analysis on these systems," Napier remarked. Their value lies in the ability of managers at all levels "to truly build a fence around their environments, put in their assumptions and then test them," Napier added.

Citing a term coined by one of his graduate students, Napier concluded that DSS provide "creativity enhancement" — the ability to contract the decision-making process. Although dangers may lurk in that simplification process, he warned, DSS offer a sometimes incomplete but credible tool for executives to examine assumptions, forecast risks and respond quickly to change in a demanding business environment.

H. Albert Napier

GRAPHICS
MADE SIMPLE



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Calendar

July 12-13, New York — **CICS/VS Application Programming Command Level.** Contact: On-Line Software International, 65 Rt. 4 E., River Edge, N.J. 07661.

July 12-14, Piscataway, N.J. — **DL/1 Applications Programming.** Contact: Ilene Zelin, Comped, 1133 Ave. of the Americas, New York, N.Y. 10036.

July 12-16, Orlando, Fla. — **The Software Summit Series.** Contact: The Education Foundation of the Data Processing Management Association, P.O. Box 91295, Los Angeles, Calif. 90009.

July 12-16, San Francisco — **Software Physics and Systems Management.** Contact: Institute for Software Engineering, 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

July 12-16, Denver — **Systems Analysis Workshop.** Contact: Bill Schoonmaker, BSI, 4720 Montgomery Lane, Bethesda, Md. 20814.

July 12-16, San Francisco — **Fundamentals of Computer Systems Analysis and Design.** Contact: American Management Associations, 135 W. 50th St., New York, N.Y. 10020.

July 12-16, New York — **CICS/VS Command-Level Applications Programming.** Contact: Ilene Zelin, Comped, 1133 Ave. of the Americas, New York, N.Y. 10036.

July 12-16, Boston — **CICS/VS Internals.** Contact: Computer Education Services of Boston, Inc., 739 Boylston St., Boston, Mass. 02116.

July 12-16, Piscataway, N.J. — **CICS/VS Macro-level Applications Programming.** Contact: Ilene Zelin, Comped, 1133 Ave. of the Americas, New York, N.Y. 10036.

July 12-30, Summit, N.J. — **Ansi Cobol.** Contact: Chubb Institute Advanced Training Center, 480 Morris Ave., Summit, N.J. 07901.

July 13-14, New York — **Xerox Professional Sales Training.** Contact: Adapso, Suite 300, 1300 N. 17th, Arlington, Va. 22209.

July 13-15, Los Angeles — **Data Communications Concepts Seminar.** Contact: Memorex Customer Education, San Tomas at Central Expwy., M/S 05-85, Santa Clara, Calif. 95052.

June 14-15, Washington, D.C. — **Office of the Future Today!** Contact: National Institute for Management Research, P.O. Box 3727, Santa Monica, Calif. 90403.

July 14-15, Denver — **Deregulation: Impacts and Solutions.** Contact: U.S. Independent Telephone Association, Suite 1201, 1801 K St., N.W. Washington, D.C. 20006.

July 14-15, Cary, N.C. — **SAS Color Graphics Course.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

July 14-16, Boston — **Network Communication Protocols.** Contact: Center for Advanced Professional Education, 11928 N. Earlham, Orange, Calif. 92669.

July 14-16, New York — **Distributed Systems: Effective Approaches and Applications.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

July 14-16, San Francisco — **Telecommunications Management: Cost Reduction Techniques.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

July 14-16, Chicago — **Data Security: Implementation and Management.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

July 14-16, Washington, D.C. — **Data Communications: Effective Network Design.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

July 14-16, Washington, D.C. — **Data Base Management Systems: Concepts and Guidelines.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

July 14-16, Washington, D.C. — **Computer Operations Management: Effective Techniques.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

July 14-16, Washington, D.C. — **Minicomputer Systems: Guidelines for Successful Selection, Acquisition & Operation.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

July 14-16, Washington, D.C. — **Advanced Business Communications Network.** Contact: George Washington University, Continuing Engineering Education, School of Engineering and Applied Sciences, Washington, D.C. 20052.

July 15, Framingham, Mass. — **Project Management.** Contact: Continuing Professional Education, Worcester Polytechnic Institute, Worcester, Mass. 01609.

July 15-16, Piscataway, N.J. — **IMS/VS Data Communication Applications Programming.** Contact: Ilene Zelin, Comped, 1133 Ave. of the Americas, New York, N.Y. 10036.

July 15-16, Sunnyvale, Calif. — **IMS Systems Management Workshop.** Contact: Institute for Software Engineering, 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

July 18-19, Carmel, Calif. — **Optical and Video Disc System.** Contact: Institute for Graphic Communication, 375 Commonwealth Ave., Boston, Mass. 02115.

July 18-21, Philadelphia — **The Expanding Dimensions of Automation in Information Processing.** Contact: Recognition Technologies Users Association, P.O. Box 2016, Battenkill Building, Manchester Center, Vt. 05225.

July 19-20, Stamford, Conn. — **Software: A Legal Briefing for DP**

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! PIE, 200, 90, 120

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Calendar

Professionals. Contact: The American Institute for Professional Education, Carnegie Building, 100 Kings Road, Madison, N.J. 07940.

July 19-20, Boston — **Word Processing Systems & Management.** Contact: Thomas Wilds Associates, Inc., 516 Fifth Ave., New York, N.Y. 10036.

July 19-21, Montreal — **Planning a DP Disaster Recovery Program.** Contact: Computer Security Institute, Educational Resource Center, P.O. Box 528, Matawan, N.J. 07747.

July 19-21, Washington, D.C. — **Peripherals for Mini, Micro and Personal Computers.** Contact: George Washington University, Continuing Engineering Education, School of Engineering and Applied Sciences, Washington, D.C. 20052

July 19-21, Washington, D.C. — **Converging Information Systems.** Contact: National Institute for Management Research, P.O. Box 3727, Santa Monica, Calif. 90403.

July 19-21, New York — **Computer Performance Measurement and Capacity Planning.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

July 19-21, Chicago — **DP Project Management: A Practical Approach.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

July 19-21, Washington, D.C. — **Data Communications: An Introduction to Concepts and Systems.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

July 19-22, Seattle — **Jovial-Ada User Group.** Contact: Dr. Maretta Holden, Boeing Military Airplane Co., Mail Stop 4A-29, P.O. Box 3707, Seattle, Wash. 98124.

July 19-22, Manchester, UK — **Second International Conference and Exhibition on CAD/CAM.** Contact: Scientific and Technical Studies, Oyes IBC Ltd., Norwich House, 11-13 Norwich St., London EC4A 1AB, England.

July 19-23, Boston — **CICS/VS Application Programming (Command Level).** Contact: Computer Education Services of Boston, Inc., 739 Boylston St., Boston, Mass. 02116.

July 19-23, New York — **CICS/VS Application Programming Command Level.** Contact: On-Line Software International, 65 Rt. 4 E., River Edge, N.J. 07661.

July 19-23, Pittsburgh, Pa. — **Structured Analysis/Design Workshop.** Contact: Structured Methods, Inc., 7 W. 18th St., New York, N.Y. 10011. Also being held in Richmond, Va., July 19-23.

July 19-23, Boston — **Quality Assurance & Testing Workshop.** Contact: Structured Methods, Inc., 7 W. 18th St., New York, N.Y. 10011.

July 20-21, San Francisco — **Structured Implementation: Putting Structured Techniques to Work.** Contact: Abbott, Galvani Associates, Suite 300, 2001 Union St., San Francisco, Calif. 94123.

July 20-21, Detroit — **SAS Basics Course.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

July 20-22, Oak Brook, Ill. — **Efficient Selection of Software Packages.** Contact: Art Levine, Cara Corp., Suite 110, 611 E. Butterfield Road, Lombard, Ill. 60148.

July 20-23, Cary, N.C. — **SAS Processing Course.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

July 21-22, Dallas — **SAS Basics Course.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

July 21-23, Washington, D.C. — **Computer-Aided Design/Computer-Aided Manufacturing.** Contact: Director, Continuing Engineering Education, School of Engineering and Applied Sciences, George Washington University, Washington, D.C. 20052.

July 21-23, Phoenix — **Data Communications Systems.** Contact: Center for Advanced Professional Education, Inc., 11928 N. Earlham, Orange, Calif. 92669.

July 21-23, Washington, D.C. — **Introduction to Statistical Analysis System.** Contact: Applied Technology Associates, Inc., Suite 1418, 1710 Goodridge Drive, McLean, Va. 22102.

July 22-23, Montreal — **DP Security Controls.** Contact: Computer Security Institute Educational Resource Center, P.O. Box 528, Matawan, N.J. 07747.

July 22-23, San Jose, Calif. — **Software Cost Estimating.** Contact: Education Foundation of the Data Processing Management Association, P.O. Box 91295, 5959 W. Century Blvd., Los Angeles, Calif. 90009.

July 22-23, Washington, D.C. — **Implementing Advanced Communications Technologies.** Contact: Business Planning Institute, Communications Workshops, 12611 Davan Drive, Silver Spring, Md. 20904.

July 22-23, Los Angeles, Calif. — **Effective Use of CAD Systems.** Contact: Elois Wenker, National Computer Graphics Association, Suite 300, 2033 M St., Washington, D.C. 20036.

July 25-30, Cambridge, Mass. — **The Fifth Annual Harvard Computer Graphics Week.** Contact: Harvard University Graduate School of Design, Ann Quenin, Conference Manager, Special Programs Office, Cambridge, Mass. 02138.

July 25-30, New York — **DP Training Managers Workshop.** Contact: Deltak, Inc., 1220 Kensington Road, Oak Brook, Ill. 60521.

July 26-27, Arlington, Va. — **SAS Basics Course.** Contact: SAS Institute Inc., P.O. Box 8000, Cary, N.C. 27511.

July 26-29, Dallas — **CICS/VS Application Design.** Contact: On-Line Software International, 65 Rt. 4 E., River Edge, N.J. 07661.

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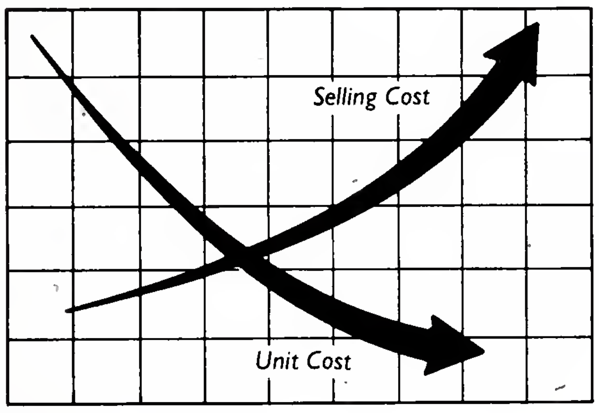

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EDITORIALS

Baby Bell: The Competition . . .

The christening of Baby Bell as American Bell, Inc. (ABI), AT&T's unregulated subsidiary [CW, June 21], undoubtedly will increase user interest in smart network services. It also may lead to some repricing and service reconfiguration, as indicated by a comparison of prices for ABI's Advanced Information Systems/Net One with those charged by Tymnet, Inc., one of the new AT&T subsidiary's major competitors (the other being GTE Telenet Communications Corp.).

For example, ABI is asking $250/mo for a 300 bit/sec private analog port and $275/mo for a similar 301- to 1,200 bit/sec facility. In each case, the charge includes one modem.

Tymnet, by comparison, charges $225 for a dedicated private line port able to accommodate 110- to 1,200 bit/sec transmissions. Its fee includes the modem at both ends of the access line as well as the line itself.

The ABI service, however, includes network storage of user programs (for an additional fee), a capability not presently available from Tymnet.

The proposed charge for dial-up access to AIS/Net One begins at seven cents per minute for service at up to 1,200 bit/sec and rises to 16 cents for 2,400- to 4,800 bit/sec access. Tymnet's rate is generally less, particularly since it offers both volume and off-peak discounts.

On the other hand, the new AT&T subsidiary offers public access at speeds up to 4,800 bit/sec, while the comparable Tymnet offering supports only 110- to 1,200 bit/sec transmission.

Since ABI does not plan to begin offering commercial service until the third quarter of 1983, it will be a while before Bell's competitive market entry produces any substantive competitive effects.

. . . And the Issues

While establishment of Bell's separate subsdiary has now been authorized by the Federal Communications Commission, a number of questions remain to be answered:

- The FCC's Second Computer Inquiry Decision — the ruling that legitimized ABI and its new service offering — has been taken to the District of Columbia Circuit Court of Appeals by the Computer and Communications Industry Association and others.
- Judge Harold Greene, who is presiding over the U.S. vs. AT&T antitrust suit, is considering whether further divestiture of AT&T — beyond separation of Bell operating companies from the rest of the Bell system — is necessary.
- It is not evident how soon the FCC will authorize Bell Packet Switching Service (BPSS), the underlying transmission pipe for AIS/Net One. While ABI could lease circuits from AT&T Long Lines Division if BPSS became stuck in a legal and regulatory quagmire, it is unclear whether the proposed rate schedule would stay the same.
- A related question is the extent to which ABI will be able to share expenses with AT&T. The FCC has decided what general administrative services can be shared, but as commission spokesmen have admitted, the difficult sharing questions have been deferred.

To the extent that sharing reduces ABI's costs, it will presumably reduce rates for AIS/Net One and future service offerings. But the more sharing allowed by the commission, the greater the opportunity for ABI and AT&T Long Lines to exchange inside information concerning such matters as network interface modifications and new services.

As a result, there is likely to be quite a fight — on Capitol Hill, at the FCC and in Judge Greene's courtroom — between now and the time AIS/Net One goes on the air.

DATA PAST

Five Years Ago
July 4, 1977

WASHINGTON, D.C. — The Justice Department formally revoked a memorandum authorizing the Federal Bureau of Investigation to develop a computerized mesage-switching system.

The system, which would have served but could also monitor the communications functions of state and local law enforcement agencies, was turned down by the Ford administration as a threat to privacy and civil liberties. The message-switching plan brought cries of "Big Brother" from congressional critics who had hoped the plan was dead.

— — —

LOS ANGELES — Noise pollution was being studied and often reduced at several airports across the country using a computerized monitoring system that could separate jet aircraft from other noise.

Installed in various communities, the systems ranked the severity of aircraft noise in comparison with other neighborhood sounds such as cars, trucks, lawn mowers and barking dogs.

Ten Years Ago
July 12, 1972

WASHINGTON, D.C. — The government found a new use for the Social Security number. As of July 1, 1972, it also became an individual's Taxpayer Identification (TID) number, and all banks were required to use it to facilitate retrieval of records.

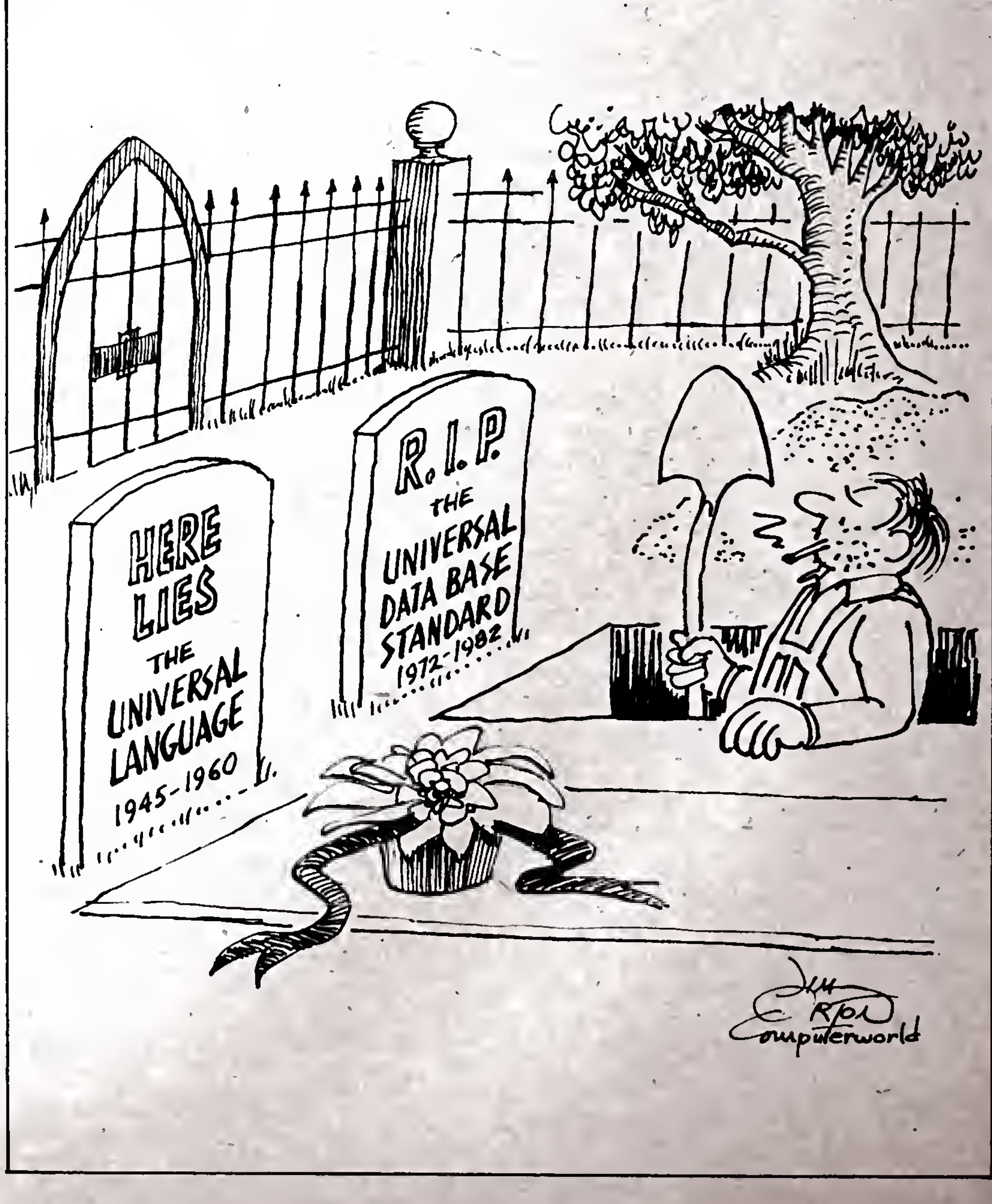
Corporations would have separate TID numbers, government sources reported, but for individuals it would be the Social Security number.

— — —

SAN FRANCISCO — The first 360/30 with a core upgrade was in operation here and the user was pleased with the initial results.

The 256K unit was installed in the San Francisco Data Center of Greyhound Computer Corp. by Computer Consultants and Services.

In a test comparing the 256K 30 against a 256K 40 on a series of heavily CPU-bound compiles, Greyhound found that "the job took only 18 minutes with the 256K 30, as compared to 14.5 minutes on the 40," according to Larry Larsen, general manager of the data center.



GETTING AHEAD IN DP /Donald J. Berardo‡

What to Do When a Headhunter Calls

'Consider these actual cases: A woman called and asked to speak to the secretary of the head of a DP division. She told the secretary, who was new, that she was calling to update the home office directory and wanted to be sure she had the names of the programming staff right. The secretary helpfully read off the names. The headhunter gleefully wrote them down . . .

'The point is that some headhunters will use any trick to gain entry, and eventually one or two will succeed.'

You've learned that your DP division is under siege. You have had some turnover. People are asking more questions about salary, promotions, benefits. A few people have begun taking longer lunches and are receiving more personal calls at the office. You suspect that you're being raided by a headhunter.

What would you do?

First, you must realize that you can't stop headhunters from hunting and you can't completely stop your employees from listening to their offers.

Greed and Wiliness

There are tactics to slow them down and minimize their success, but as long as DP salaries keep spiraling upward, headhunters will do brisk business, for two reasons: People are greedy and headhunters are wily.

Consider these actual cases: A woman called and asked to speak to the secretary of the head of a DP division. She told the secretary, who was new, that she was calling to update the home office directory and wanted to be sure she had the names of the programming staff right. The secretary helpfully read off the names. The headhunter gleefully wrote them down.

Or, consider the woman who called a DP manager and said she was a college student interested in DP, but wanted more information. "OK," she said, "I'd prefer to talk to some of the programmers who are really doing it."

The manager smelled a headhunter and refused. A week later, she called and tried to recruit *him*.

The point is that some headhunters will use any trick to gain entry, and eventually one or two will succeed.

Some companies panic and respond with shortsighted warfare. They shut down fee-paid hiring, for instance, which only causes the headhunters who have been recruiting *for* you to redouble their efforts to recruit *from* you.

Other companies use the Big Brother approach — they allow only supervisors to have phones or they start monitoring phone calls. These tactics only make employees more eager to leave.

More sensible measures include warning all secretaries as well as staff that headhunters will inevitably be calling and to be ready for them.

Remind your employees that it's against company policy to talk to headhunters on company time.

Instruct secretaries to route any suspicious calls directly to you.

If your unit gets hounded by a particularly sneaky headhunter, confront him on the phone and tell him that you're going to spread word of his tactics to your DP colleagues in other companies. It works, sometimes.

There are also some formal procedures that can help alert you to headhunters and hinder their efforts. Develop a thorough *exit interview mode.* This will tell you why people leave, where they're going and whether there are people within your company whose managerial tactics are causing attrition.

If you find that exiting employees are getting offered more money than your company is paying, approach the personnel department with the information and tell them you must adjust your salaries or you will lose your best people.

You should also develop a *selection model* that allows you to weed out potential headhunter bait — that is, people with a record of mobility. Don't hire people whose work experience shows a pattern of frequent job movement with only dollars, and not growth or opportunity, as the apparent motivation.

Finally, create a *retention model* that identifies high potential employees, the ones you want to keep especially challenged and contented, which will lessen their susceptibility to the headhunter's lure.

The best defense of all against headhunters is a healthy work environment and open communication. If you can establish these, then you'll only lose the greedy — which can be *positive* attrition.

- Accept the fact that some attrition is inevitable.
- Notice the symptoms of a raid by headhunters.
- Take steps to minimize their success.
- Set up appropriate exit, hiring and retention models.
- Establish a healthy environment and open communication.

Berardo is a management counselor and career therapist.

He is a vice-president with the Meld Group in Newington, Conn., publishers of a monthly newsletter on management development.

HUMAN CONNECTION /Jack Stone‡

Controlling Data Center Employees Takes More Than Operational Aids

This is Part 9 of a continuing series on how to succeed as a data center manager.

Management pundits say that one measure of the effectiveness of an organization is that "trained employees are working as smoothly operating teams under the close supervision of management that guides their actions toward organizational goals."

Wouldn't it be a great day if you could say these glowing words about your data center?

Stephen Roberts, a manager at the Catholic University of America data center, was determined to improve organizational effectiveness and focused on bringing the programming staff to the office during normal working hours as a first major step.

But the task was difficult because he had to maintain existing systems at the same time he was implementing operational changes.

It took him nearly two years to introduce gradually a number of new policies aimed at relieving work pressures — real and imagined — on the staff and eliminating excuses for not coming in during the hours of nine to five.

Prime-Shift Machine Time

One matter not at issue was the availability of prime-shift machine time for program development. Karl Thomas, center director, was a strong advocate for such support, believing that services to both users and programmers were of equal importance.

Even in 1975, daytime on-line access to the ANS Cobol compiler was provided, including full-screen edit of source code and 10-minute compile time for a 2,000-line program with 30-minute turnaround time for its source listing.

The final operational problem that had to be resolved was the issue of job stream control.

The normal mode of systems operation required that terminals be employed by the users during business hours for data entry/validation and some limited inquiries and that job streams be run during nonprime time in the batch environment to produce reports and update the master files.

But the job streams were not programmer-independent, and the technical staff was forever being called to come in during off-hours — first, to set up runtime parameters because the Job Control Language procedures were so complicated and, second, to debug systems operations failures because the procedures, having been developed in a hurry, were not checkpoint-restartable.

So Roberts announced that job streams would henceforth be programmer-independent and launched yet another parallel effort to modify the procedures on a system-by-system basis to meet this goal.

Specifically, he wanted runtime parameters to be entered by a production control clerk who would base the entries on simple forms completed by the users and job restarts to be handled by the machine operators without programmer intervention.

Although the staff was more than unhappy about the previous policy changes, it was incensed about this one, claiming, "It can't be done! You can't possibly account for all the system failures!"

But Roberts held firm, having had the experience to know that improvements in the JCL code were completely feasible and that the effort was worthwhile even though every last nighttime call to a staff member might not be eliminated.

He also completed some tough negotiations with the users and reduced the number of critical jobstreams — those that absolutely, positively, most assuredly had to run on a scheduled evening — from about a hundred to a half dozen.

He often laid in wait for user pickup of "urgently needed" production output, and when the user took his sweet time about it, Roberts used this fact as a bargaining chip.

Well, changes in the procedures were made and they worked. As time went on, fewer and fewer calls went out to the staff from night-shift operators.

Now it's a rare event to have a programmer show up out-of-hours for this purpose.

As a side — but very significant — benefit, job accounting data has suggested the release of about 20% of the machine resources after the programmers ceased to be involved with production.

On-Line Program

What's more, these days users are setting up their own job streams with the aid of an on-line program, developed at the center, which prompts the users for runtime parameters and inserts them into the JCL procedures.

But as the operational changes were in the process of completion, the staff still didn't evidence interest in showing up during prime shift.

This proved what Roberts suspected all along: that the real problems involved in getting the staff to work regular hours were related to personnel attitudes and were not exclusively operational in nature.

Letters to Stone should be addressed to him at Box 270, 1377 K St. N.W., Washington, D.C. 20005.

Converting to a New Operating System?

As processing demands grow within the data center and hardware costs continue to decline, changes take place within the data center. Sooner or later the data center operations manager will find himself faced with the necessity of resolving the question of moving to a more powerful operating system.

Because of the magnitude of the undertaking and the long-term implications and ramifications of such a change, the decision to move to a larger operating system and the selection of that system from several options is one that must be made with appropriate care.

Additional Costs

Often, in addition to the environmental considerations, there will be substantial additional costs in increased software and/or hardware that must be justified as part of the change of operating systems.

What are some of the forces that will compel a manager to consider seriously the movement to a larger operating system? The expanded use of more sophisticated processing techniques, such as data base, teleprocessing networks and improved programmer productivity are some of the considerations.

An increasing work load may also be a factor. As the work load grows, increasingly large hardware capacity will be required to accommodate that work load.

In time, a circumstance will develop in which the required hardware capacity necessary to process the work load cannot be handled by the operating software. The hardware will have outgrown the operating software. The manager who has let himself come to such a situation has a serious problem.

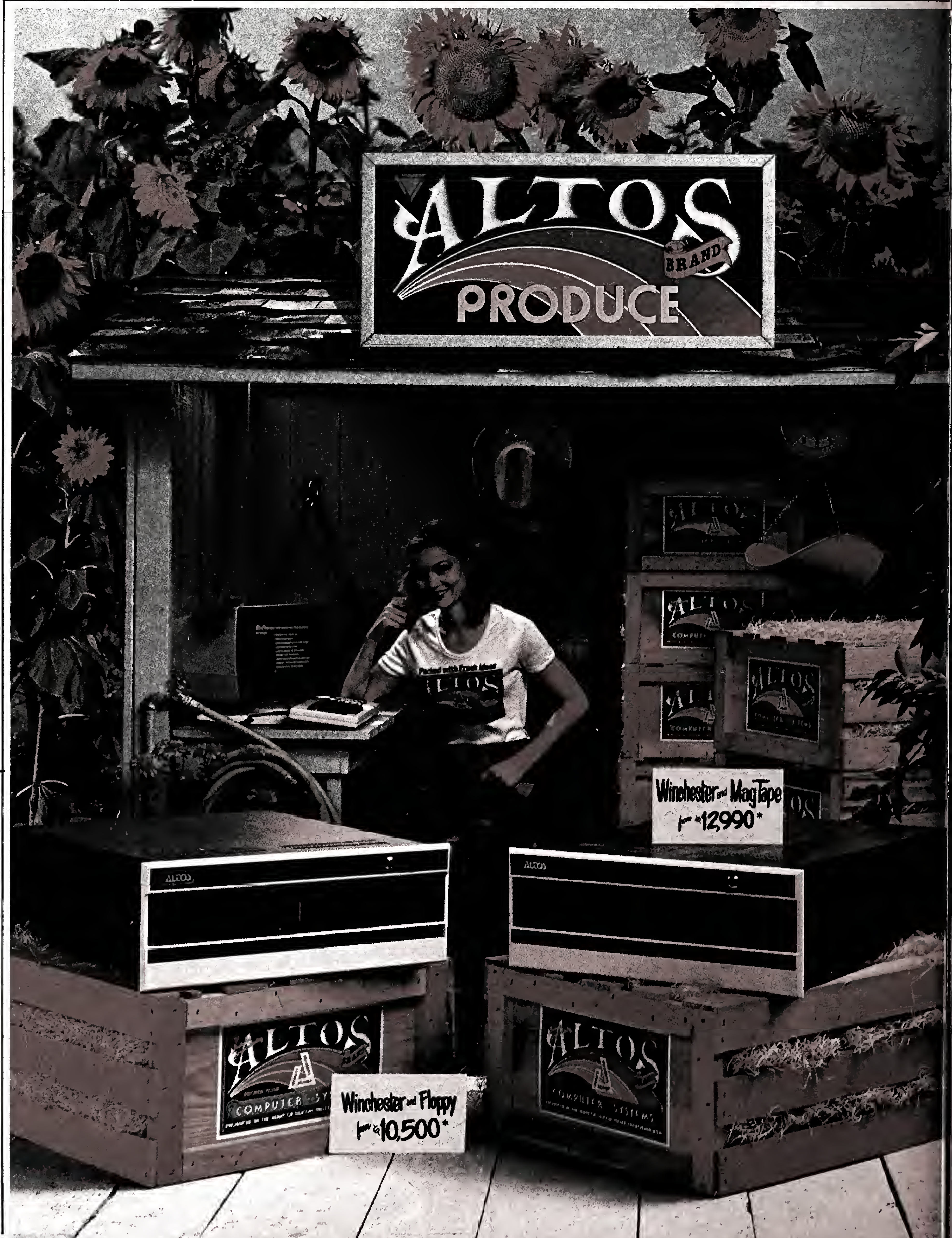
The timing of the conversion may be the most critical consideration. Often the sheer size and scope of the conversion project tends to make the manager reluctant to begin the conversion process.

How does the manager determine when to move to the larger operating system? While specific factors will vary from data center to data center, there are certain aspects that will provide clues to the need before it becomes urgent.

The manager should develop a data center work load configuration. This configuration should then be used to build a data center work load profile.

A series of questions can now be developed. What is the nature of the work that will be coming to the data center? What processing techniques will be required? What about database, teleprocessing, networking and distributed processing? How large will the hardware be (in particular the CPU) that will be required to handle this work load? What operating system will be required?

Once the manager has developed the basic information, he can plan for the needed operating software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John P. Murray‡

Consider Cost, Capacity and Company Politics

well in advance of the actual need for the software.

Because of the scope of the conversion effort and the expense involved in the movement to a larger operating system, a well-developed, logical, cost-justified conversion plan must be presented to senior management.

Often there will be more than one conversion option available. These options require careful consideration. If possible, a long-term view should be adopted.

As an example, one of the options may be considerably less expensive and may involve a great deal less effort and potential trauma. While on the surface this may appear to be the most appropriate solution, it may not be the best choice.

If it appears that the growth of the processing demands will make this less expensive choice obsolete in several years, it may well be much more desirable to choose the more complex solution.

The manager may, faced with this situation, decide to use a phased approach, to install the smaller operating software and then, once that is in place, begin the move to the larger system.

If the selected approach is to move to the larger system in two stages, the manager must be certain that his senior management is aware that this effort is a multiple-step process.

He cannot allow himself to be placed in a position in which he has sold the concept of an operating software system upgrade, yet failed to make it clear to management that this will be accomplished over time and in stages.

Because this will, in all likelihood, be the largest single data center project ever attempted, the manager must be sure he has strong management support.

Being faced with the prospect of going back to sell management step 2 of the conversion, which they probably do not understand, and when they felt that the original approval was the total approval, can be a very unfortunate experience.

Opportunity to Review

As a part of the conversion process, the manager should be aware of the opportunity to review and, where appropriate, institute and enforce improved data center standards.

Many of the operational difficulties caused by programs can be corrected through this process. While this effort will lengthen the process and add to the expense, it is an ideal time to do this work.

With the exception of those data centers that currently use the largest data processing operating software, it is inevitable that the manager will be faced with making an operating system upgrade. While this can be a massive task, it can also provide substantial benefits.

The objective should be to accomplish the conversion in the most expeditious, yet thorough manner possible. Adequate planning and preparation will make the effort a success.

Murray is director of management information systems (MIS) for Ray-O-Vac Corp., Madison, Wis. He is responsible for worldwide MIS activities. Murray has 20 years of DP experience, 10 of which have been devoted to the management of data centers.

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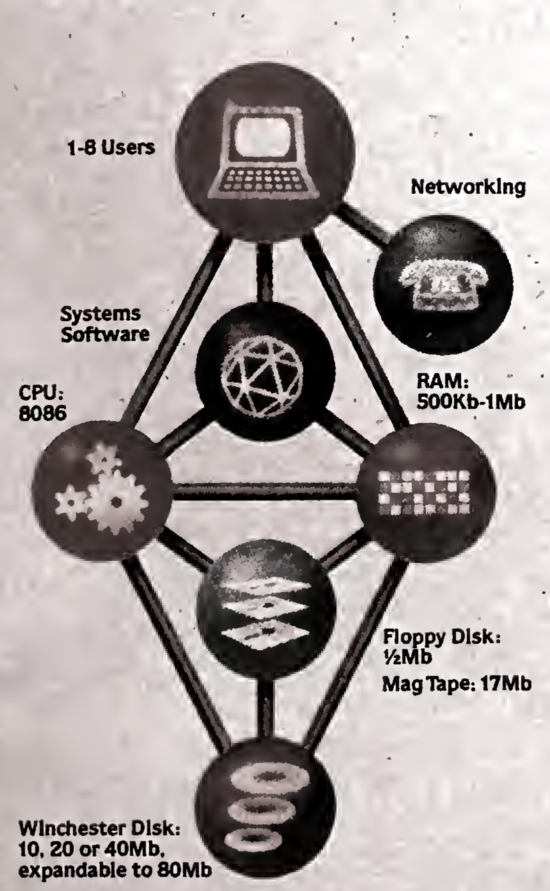

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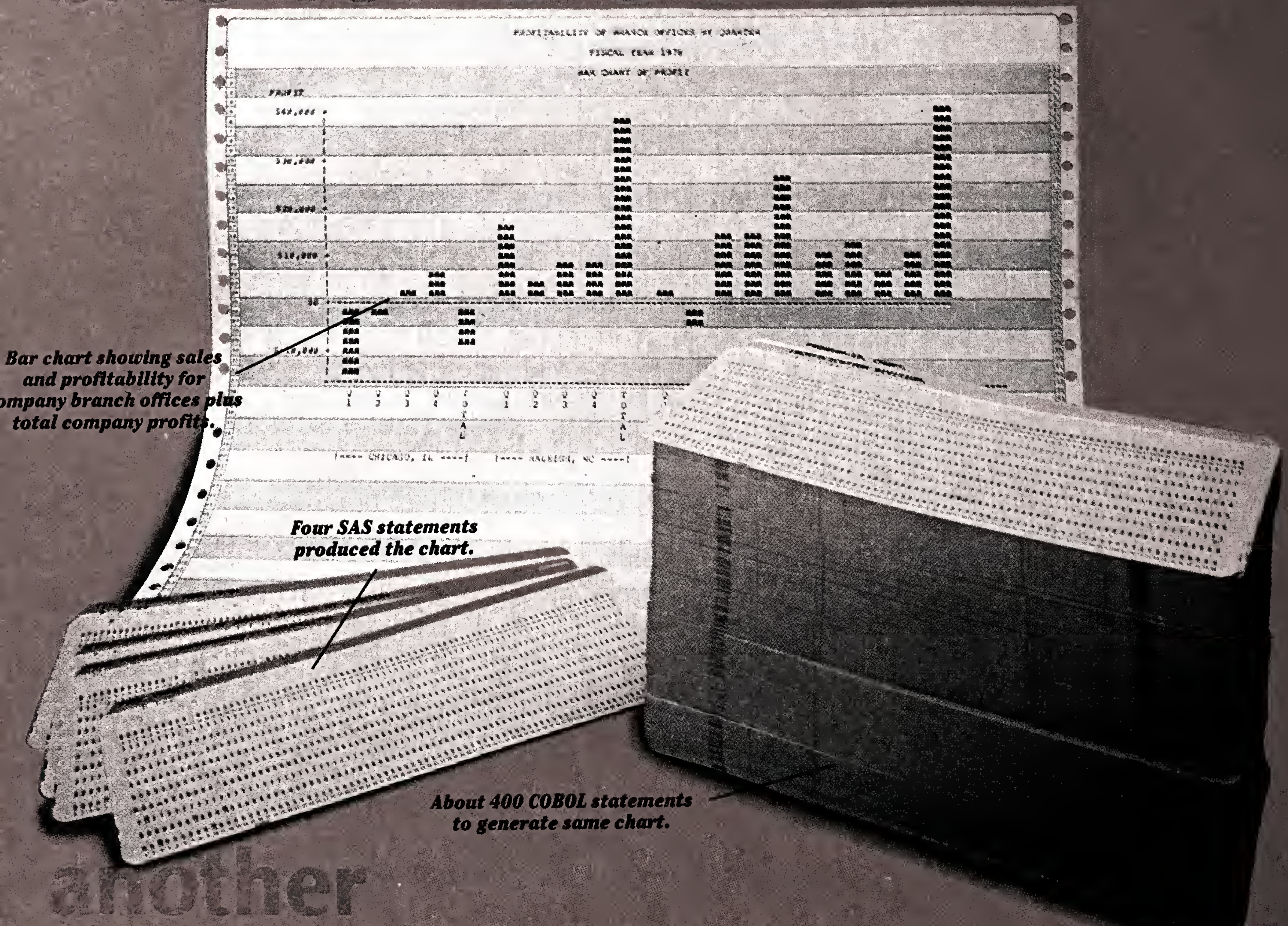

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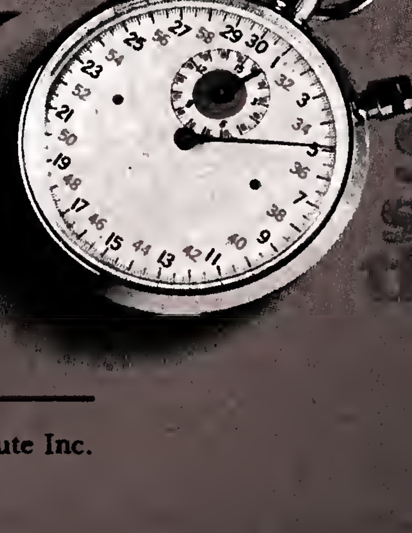

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Screen Format Aid Targets Users Of IBM IMS, TSO

SUNNYVALE, Calif. — An on-line, interactive screen-formatting application package intended to simplify the design and implementation of screens for IBM's IMS/DC and TSO applications was introduced here by Boole & Babbage, Inc.

Screenform reportedly provides a method for designing, creating and maintaining screen formats using the capabilities of an IBM 3270 terminal. Formats that are entered or changed at the terminal are stored and maintained by Screenform as screen masks in a format data base.

For IMS/DC, Screenform uses these definitions to provide automatic generation of the macros required to produce a complete IMS/DC screen format, and formats can reportedly be changed or new ones added to the format library by adjusting the layout of the format as it is presented on the screen by Screenform.

Screenform's features include creation of IMS or TSO screen formats; use of IBM 3270 screen capabilities; screen formatting for applications written in assembler, Cobol, PL/I and Fortran; and on-line simulation for format testing.

Screenform is written in assembler and operates on any system that supports IMS or TSO, the vendor said. Release 3.2.1 of Screenform costs $12,500, which includes one year of product maintenance.

Boole & Babbage is headquartered at 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

Production Version Out Of Nested Arrays for APL

ROCKVILLE, Md. — STSC, Inc. has announced the release of a full production version of a nested arrays extension to APL.

The nested arrays function was made available to its customers last year as an experimental research implementation of APL, STSC noted, claiming it was the first commercial version of this feature. The production release of nested arrays is said to include new user-tested APL primitives for STSC's APL*Plus System, which is available for IBM 370 and 4300 or compatible systems running under VM/CMS.

The vendor expects to release nested arrays as part of its APL*Plus/1000 applications development system product in July 1982. The production version of nested arrays are available immediately on STSC's APL time-sharing network.

APL primitive functions process an entire multidimensional table or array of information at one time, where each item in the array is a single value, the vendor explained. Using nested arrays, however, any item in the array can itself be an array of any rank, shape or type. The new data structures that this makes possible allow a more natural representation of data for common business applications.

The nested arrays features are said to remove some of the restrictions of traditional APL by allowing users to write very logical data structures that coincide with the way they perceive problems, to write applications features in a shorter time and with the code taking up less space and to mix numeric and character data in any array.

The APL*Plus/1000 product will include the nested array enhancements to the VS APL language, a file printing and conversion facility, a data management utility and a set of APL software development tools and programmer utility work spaces. The entire package is available for $70,000, the vendor said from 2115 E. Jefferson St., Rockville, Md. 20852.

Program Generator Geared To IBM CICS Environment

RIVER EDGE, N.J. — On-Line Software International, Inc. has announced Insyst, an applications program generator for the IBM CICS teleprocessing environment.

Insyst is described by the vendor as an interactive development tool designed to maximize programmer productivity by minimizing the CICS programming effort. It is intended for users of IBM or plug-compatible systems in a CICS environment running under the DOS and OS operating systems.

Entry-level programmers using Insyst reportedly can store file descriptions and define applications for on-line execution by end users.

The software package is intended to enable programmers to specify requests by filling in blanks on an IBM 3270 terminal screen. It therefore eliminates some programming code.

Insyst enables programmers to screen formats without requiring IBM's Basic Mapping Support and does not require CICS program table changes, according to the vendor.

Depending on the configuration, Insyst costs between $15,000 and $18,000. On-Line Software is at 65 Rt. 4 E., River Edge, N.J. 07661.

'Mics' for MVS Gets Four Modules

VIENNA, Va. — Morino Associates, Inc. has added system reliability, installation accounting, basic performance management and capacity planning components to its IBM MVS Integrated Control System (Mics).

The system reliability component was designed to use the standard error records collected to build information in the Mics data base, to generate exception reports and to integrate the reliability data with other information areas.

Installation accounting supports charges for batch jobs and IBM TSO, IMS and CICS usage based on any combination of data elements in the Mics data base. It also supports user-defined surcharges, discounts and differentials and generates a consolidated invoice report that quantifies a user's total data processing expenditures.

The performance management component is intended to focus on installation performance specification, I/O subsystem, auxiliary storage management, batch work load and real storage management.

The capacity planning component reportedly provides the capacity to utilize work load profiles, simple trends and business element forecasts.

First-year license fees for the components are the following: system reliability, $4,400; installation accounting, $3,000; basic performance management, $3,000; and basic capacity planning, $4,500.

Morino Associates is in Suite 602, 8133 Leesburg Pike, Vienna, Va. 22180.

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CICS Print Facility Added

On-Line Spooling System Expanded

POULSBO, Wash. — A CICS print facility (CPF) has been added to Release 2 of Software Technology, Inc.'s on-line spooling system.

Release 2 reportedly allows users of large IBM mainframes to spool reports from IBM's JES2 and JES3 automatically to the on-line system. The user may specify form alignment commands to align a special form, and a report that is printing can be canceled, restarted or interrupted, the vendor said.

Other CPF features reportedly include the ability to specify multiple, logical or physical destinations for spooled reports; message sending and IBM 3270 screen copy; interface with Natural, Software AG's programming language; and report index of available reports. The vendor noted that printed reports may be deleted or retained in the spool, and users can spool from CPF spool to batch spool. In addition, there are security units insuring controlled access to reports.

CPF supports Cobol and assembler programs operating under CICS/VS 1.4 or above. The spool files are Vsam, KSD and RRN. CPF can also run on IBM's MVS operating system, according to the vendor.

The price of Release 2 is $15,000, including one year maintenance. Software Technology is at 5492 N.E. Laura Court, Poulsbo, Wash. 98370.

'Pac II' Available on System/38

KING OF PRUSSIA, Pa. — International Systems, Inc.'s Pac II System is available on the IBM System/38.

The project management software package was designed for project planning, budgeting, monitoring, analysis, costing and managing. The Pac II System is written in Ansi Cobol.

The perpetual license fee for the Pac II System is $26,000. International Systems is located at 890 Valley Forge Plaza, King of Prussia, Pa. 19406.

Job Controller Runs on IBM, Compatibles

SACRAMENTO, Calif. — Software Module Marketing, Inc. has made available the Execution Scheduling Processor/Dependent Job Control package for users of IBM mainframe and plug-compatible installations.

The package is said to provide compatible dependent job control of IBM's JES3 for the JES2 operating environment. It reportedly enables the programmer or production scheduler to define conditional job dependencies. It was designed to maximize throughput and data integrity and to ensure that the right job is executed at the right time.

The product is priced at $12,000 for the first CPU, the vendor said from 1007 Seventh St., Sacramento, Calif. 95814.

IBM CMS Editor Fits VM/CMS

ARLINGTON, Va. — VMS/Pedit, an IBM CMS editor for use in IBM VM/CMS installations, was unveiled here by the VM Systems Group, Inc.

Pedit reportedly provides spelling checking as well as enhancements to commands such as LOCATE and CHANGE. It also includes display management designed to increase editing speed and reduce data transmission when remote terminals are used.

The software includes a HELP facility for new users and is said to be supported for IBM VM Release 6 and VM/SP systems.

Pedit is priced at $1,695 for a one-year lease. Source code and quarterly maintenance is included in the base price. The vendor is located at 3123 N. Military Road, Arlington, Va. 22207.

Income Tax Tool Fits DG Series

BIRMINGHAM, Ala. — Programmed Systems, Inc. has announced an income tax software package for the Data General Corp. CS/Cobol series. The user can key in the tax information and have it printed on federal or state tax forms, the vendor said. The package was designed for public accountants and certified public accountant firms.

End users can modify the package themselves or allow the vendor to perform the yearly updates necessary for tax information software. The package features input by tax form identification and line number, use of continuous forms and film overlays, pro formas and data organizers, the vendor said.

The package costs $2,500 for the federal tax application and $1,000 to $1,500 for each state tax application. More information can be obtained by contacting Programmed Systems, Suite 305, Centennial Building, 90 Bagby Drive, Birmingham, Ala. 35209.

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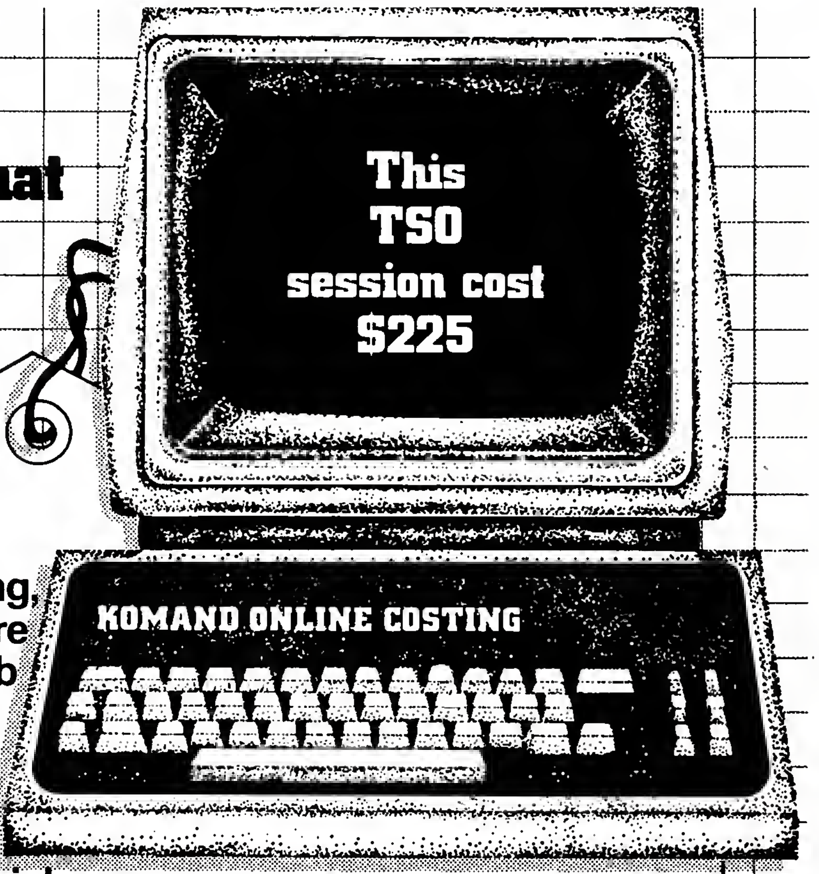

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- Online Costing provides control of resources as they are consumed. Cost-conscious users are wiser users of DP services.
- Online Costing immediately identifies the jobs and steps which are major resource consumers.

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- By providing feedback on the cost of a run at the time it runs, KOMAND Online Costing raises a red flag for problem areas as they develop.
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- Immediate costing may well be a requirement or desire of customers. No more waiting for batch or periodic billing to know charges.
- KOMAND Online Costing allows bypass of costing for selected jobs.

Users of DP Resources:

- With the job step costing feature, they can identify and analyze the more expensive portions of a job.
- KOMAND Online Costing gives an immediate answer to the question "Is this job worth its cost?"

KOMAND Online Costing is available as an option with the Data Acquisition System (DAS) of the KOMAND Job Accounting System, or as a stand-alone product. It functions with the MVS/SE2 or MVS/SP operating systems.

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—The Economist
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Data 21 Adds Security Fields Spooling Capabilities to 'RPF'

TORRANCE, Calif. — Data 21 has enhanced the security and report spooling capabilities of its Remote Print Facility (RPF) package, which was designed to interface with IBM VSE/Power queues to enable end users to display, print and submit batch jobs on IBM 3270 CRT terminals under CICS.

The vendor has added several security fields, such as Remote ID to RPF's security logic. This enables reports segmented from RPF batch or on-line segmentation routines or the output of batch jobs submitted remotely via RPF to be automatically routed to the designated end user for on-line inquiry or hard-copy printing. Another field, Sysid, was designed to allow access of reports from a power system that is shared by multiple CPUs.

RPF reportedly now provides its users with the ability to spool or segment a report into VSE/Power from a CICS program for subsequent retrieval with RPF, in addition to supporting printing interactively to CICS printers from CICS programs without the need for an intermediate spool file.

RPF is available at the one-time cost of $4,200 from Data 21 at 19110 Van Ness Ave., Torrance, Calif. 90501.

Release 3.0 of 'ASM2' Offers Physical Track Copying

LOS ALTOS HILLS, Calif. — Release 3.0 of its Automated Space Management System (ASM2) was announced here by Cambridge Systems Group. The new release includes a physical track copier capability designed to increase the speed of backups.

In addition, the maintenance release of the direct-access storage device space management software includes stand-alone restore capability, the vendor explained.

ASM2 runs on IBM and plug-compatible systems operating under OS or OS/VS. There is no additional charge for the enhancement, which will be available in December. The base price of ASM2 is $17,500.

Cambridge Systems Group is headquartered at 24275 Elise, Los Altos Hills, Calif. 94022.

Software Aids Volume Orders

ATLANTA — American Software, Inc. has announced software said to support the preparation of economical purchase orders for multiple items.

The Vendor Joint Replenishment system was designed for users with purchasing opportunities with vendors who offer deals with multiple-item volume discounts.

The system reportedly considers the time-phased requirements for each item, existing and anticipated deals and the hurdle rate for inventory investment by class of product. On-line inquiry and selected real-time functions are available as well as batch summary reports.

The software is available for IBM Vsam/CICS installations and ranges from $20,000 to $35,000, depending on features selected. The vendor is located at 443 E. Paces Ferry Road, Atlanta, Ga. 30305.

Stock Services Available via T/S

NEW YORK — Monchik-Weber Corp. has announced real-time stock market services that can be accessed on a time-sharing basis through the Tymnet, Inc. Tymnet network.

Available services include an Option Monitor Service-2, which supplies stock quotes, a Financial Futures Service and a Data Sharing Service, the vendor said.

The real-time Option Monitoring Service-2 costs $500/mo plus $20/hour for connect time. An off-hours version of the same service costs $20/hour, the vendor said.

The Financial Futures service costs $20/hour with a $250/mo minimum. The Data Sharing service costs $1,500/mo plus $20/hour during peak usage and $10 in off hours.

The vendor is located at 110 John St., New York, N.Y. 10038.

Cable TV Package Fits IBM System/23

PARIS, Tenn. — Data Processing Consultants, Inc. has introduced the Cable TV Billing and Accounts Receivable program package for the IBM System/23 Datamaster. The package is said to accommodate up to 3,300 active subscribers and up to 10 categories of subscriber service.

The system permits entry and editing of daily transactions and produces necessary audit trail printouts. Features include a master file accessible by account number, name or hookup address; and balance forward accounts receivable with aged trial balance and customer listings.

The package is available for $4,800 from Data Processing Consultants, 304 S. Dunlap, Paris, Tenn. 38242.

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Operates in Full-Screen Mode

'Screen-Aid' Ties IBM 3270 Units, Programs

NOVATO, Calif. — Tomark, Inc. has announced Screen-Aid, an online interactive programming aid designed to provide an interface between application programs and IBM 3270 display terminals in full-screen mode.

The interactive facility reportedly can be invoked from an application program written in Cobol, PL/I, assembler or directly from an IBM TSO Clist, requiring no application program, a vendor spokesman explained.

All capabilities of the IBM 3270 CRT terminal can be utilized, he noted.

Screen-Aid was designed to operate in an IBM MVS TSO environment, using Tcam or Vtam. It can be used with the Btam access method if TSO is not available.

A free 30-day trial for the product is available. Screen-Aid's introductory price is $6,950, the vendor said from Suite C-1, 250 Bel Marin Keys, Novato, Calif. 94947.

SJE Operating System Supports Job Processing on FPS-164

BEAVERTON, Ore. — Floating Point Systems, Inc. has introduced the Single Job Executive (SJE) operating system, which is said to support complete job processing on its FPS-164 64-bit attached processor.

The vendor also enhanced its program development software, which includes subroutine libraries for simulation, image processing and geophysical processing applications, as well as subroutines for table memory, random-access memory functions and Linpack (a collection of Fortran programs) Basic Linear Algebra Subprograms.

The software support will be available in July 1982 for users of Digital Equipment Corp. VAX systems and in September 1982 for IBM system users, the vendor said.

The SJE software reportedly features a job control language, support for file and terminal I/O and run-time overlaying of program code and data. It is priced at $15,000.

The program development software has been enhanced to include an expanded host resident Fortran compiler that supports a superset of the Fortran 77 language, the vendor said. The compiler is available for $10,000, plus an additional $2,500 initial license fee. The balance of the program development software, including the subroutine libraries, is available for $6,000, plus an initial license fee of $1,500.

The vendor can be contacted at P.O. Box 23489, Portland, Ore. 97223.

BBN Minis Get Four Packages

CAMBRIDGE, Mass. — BBN Computer Corp. has announced four software packages designed for its C Machine family of minicomputers.

Infomail is an electronic mail package for the firm's C/60 and C/70 processors. It includes office data management and text processing capabilities. Features include an in/out box, electronic files and an electronic wastebasket, the vendor said.

The Infomail package reportedly can support up to 32 simultaneous users and costs $20,000.

EZcalc is a computerized spreadsheet. Users may generate tables and insert them into documents. The package allows simultaneous manipulation of up to 999 rows and 676 columns. Other features include Monte Carlo simulations and a pseudo-random number generator. The package costs $500, the vendor said.

Pen is a full-screen editor that reportedly eases most "cut and paste" type operations. The package can edit multiple files in either full-screen or multiple-window modes. Other features include paragraph filling and justification. The package costs $1,500, the vendor said.

A text-formatting preprocessor has been added to the firm's specialized version of the Bell Laboratories' Unix operating system. The BBN Unix package costs $3,000, the vendor said from 33 Moulton St., Cambridge, Mass. 02238.

'Comparex' Updated

SAN MATEO, Calif. — Serena Consulting has announced Release 4.2 of Comparex, a file comparison utility for IBM and plug-compatible systems running under both OS/VS and DOS/VS operating systems.

In addition to processing data files of any structure or organization including Isam and Vsam, the package now processes text files such as program source code. The package can ignore cosmetic columnar indentation and cosmetic punctuation in isolating inserted, deleted and modified lines of text, the vendor claimed.

A perpetual license for the package is available for $8,000 from Serena Consulting, P.O. Box 5574, San Mateo, Calif. 94402.

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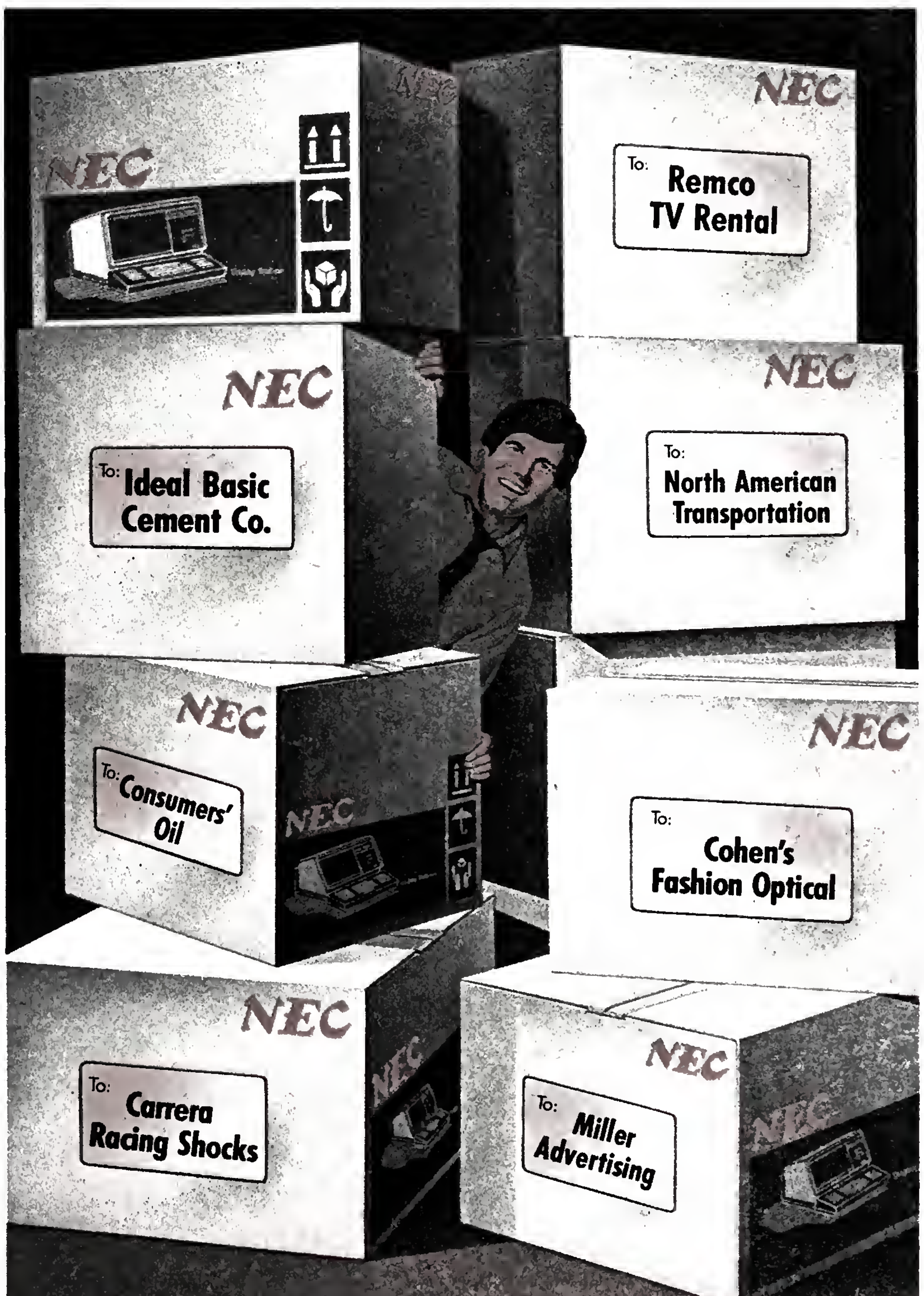
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Law Office Aid Fits Prime Minis

SANTA CLARA, Calif. — An enhanced version of Legal Insight has been released by Industry Data Services here. This package was designed to simplify law office procedures and runs on minicomputers from Prime Computer, Inc.

Legal Insight reportedly features time management and client billing, conflict-of-interest tracking, docket control/attorney calendaring, legal library, memo cataloging, accounts receivable, accounts payable, general ledger and automated litigation support.

Legal Insight costs $75,000, and Industry Data Services is located at 2560 Mission College Blvd., Santa Clara, Calif. 95050.

CSS Enhances Sofsearch

SAN ANTONIO, Texas — CSS, Inc. has enhanced its Sofsearch software locator service with a toll-free telesearch phone-in service.

Sofsearch subscribers can call in requests for software products that meet specific needs and have a list delivered to them in a minimum of three days, according to a spokesman. Sofsearch is a data base with information on more than 15,000 software products.

Costs for the telesearch vary according to the job, according to the company, which can be reached at P.O. Box 5276, San Antonio, Texas 78201.

Data Base Offers Job, Income Stats

FAIRFIELD, N.J. — The Rapidata Division of National Data Corp. has announced the availability of its time-sharing system, which offers the Drennan-CHR New York Regional Economic Data Base. The data base is said to provide statistical data and forecasts on employment and income for 53 industries and 47 occupations within the region.

More than 12,600 time series provide historical data and forecasts on annual employment for 47 occupations by occupational group.

The subscription to the data base is $4,500 annually or $2,500 semiannually. More information is available from Rapidata, 20 New Dutch Lane, P.O. Box 1049, Fairfield, N.J. 07006.

Micro Notes

The American Newspaper Publishers Association Research Institute is offering **Version 3** of the University of Tasmania **Pascal compiler test suite.** The package contains more than 435 programs designed to measure the conformity of a Pascal implementation to the requirements of the ISO Pascal standard. The package costs $50 from the vendor through P.O. Box 598, Easton, Pa. 18042.

Compugraphic Corp. has released **CP/M 86,** an operating system that is compatible with Digital Research, Inc.'s CP/M operating system. It is intended to make the company's Modular Composition System compatible with a range of business software. Compugraphic also released **Wordstar, Spellstar** and **Mailmerge** software, the first in a series of CP/M-compatible Compugraphic programs. The operating system costs $500, and the software packages cost $600, $350 and $250, respectively, the vendor said from 200 Ballardvale St., Wilmington, Mass. 01887.

Condor Computer Corp. announced that its **Series 20** microcomputer software is now available for the IBM Personal Computer, in addition to Zilog, Inc. Z80-based machines. **The Condor I** is a file management system that is upgradable and sells for $295. **The Condor III** is a relational data base system with indexing capabilities and a report writer. This package costs $995, Condor said from Suite 320, 3001 W. Big Beaver Road, Troy, Mich. 48084.

Macrop is a macroprocessor for microcomputers running IBM PC-DOS and Digital Research, Inc.'s CP/M and CP/M-86 developed by the Pluto Research Group. This product reportedly converts simple assembles into macro assemblers. According to the vendor, it adds long variable names, compile-time expression evaluation, conditional compilation and time and date stamping of source programs. All versions of the product are priced at $135 from the company through P.O. Box 50444, Palo Alto, Calif. 94303.

Altos Computer Systems, Inc. announced the availability of Digital Research, Inc.'s **MP/M II Version 2.1** for use with the Altos 8-bit microcomputer. This release of the MP/M multiuser, multitasking operating systems allows CP/M application programs to run in a multiuser environment the company said. It costs $500, Altos said from 2360 Bering Drive, San Jose, Calif. 95131.

Microrim, a relational data base system that grew out of the relational information management data base used on National Aeronautics and Space Administration space shuttle projects, has been released here by Microrim, Inc. This product offers data base management system capabilities to systems operating under CP/M for 8-bit Intel Corp. 8080/8085 and Zilog, Inc. Z80 microprocessors. It is priced in a range of $595 to $1,295, depending on options, from the vendor through P.O. Box 585, Bellevue, Wash. 98009.

Micronexus is a software package introduced by Datanexus, Inc. that is said to allow the Digital Equipment Corp. PDP-11 and VAX-11 minicomputer systems to use microcomputer software. The package resides on the host computer and makes minicomputers compatible with microcomputer software, allowing the user to run a wider range of software, according to the vendor. The package sells for $850 from the vendor at 3760 S. Highland Drive, No. 405, Salt Lake City, Utah 84106.

Standard Computer Systems has announced the availability of a package called **Emulator II.** The package was designed to enable Apple Computer, Inc.'s Apple II microcomputer to act as a conversational CRT with Microdata Corp.'s Reality minicomputer series and other systems based on Pick & Associates, Inc.'s Pick operating system, the vendor said. The package is available at the introductory price of $250 from the vendor at Suite 255, 10300 Sunset Drive, Miami, Fla. 33173.

A **Screen Copy Facility** for the Xerox Corp. 860 IPS word processing system has been introduced by Caprock Systems, Inc. The package is said to allow the user to employ one keystroke to print the current screen image on the printer. The software license is priced at $50, available from the vendor through P.O. Box 13814, Arlington, Texas 76013.

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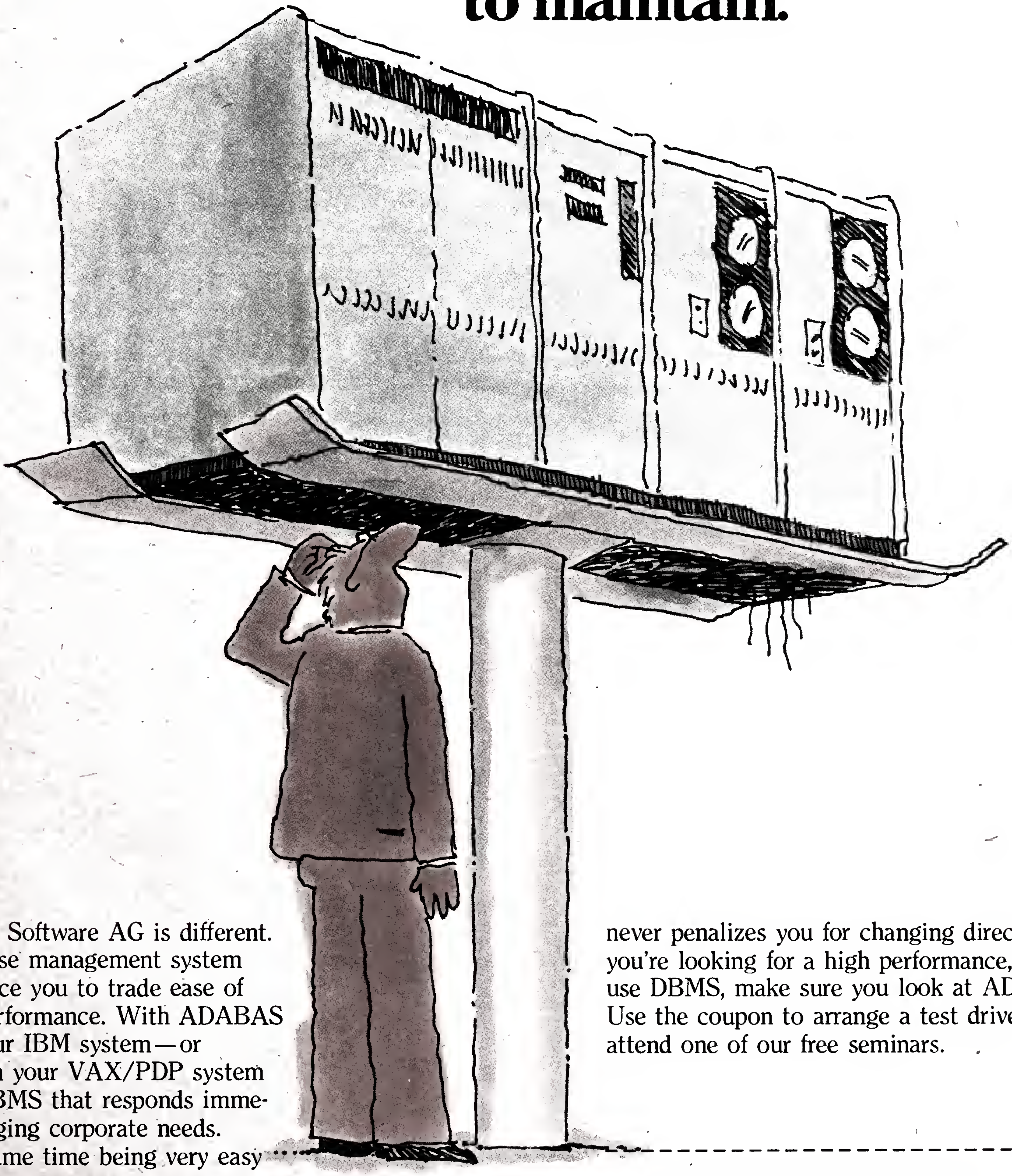

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'Pride-ASDM' Enhanced

CINCINNATI — M. Bryce & Associates, Inc. has unveiled an enhanced version of its Pride Automated Systems Design Methodology (ASDM), which is said to be a further integrated and automated approach to systems development.

Pride-ASDM consists of Pride, the systems design methodology that is implemented on a manual basis; Logic, a systems and data dictionary/directory; and the Automated Design Facility for systems and data base. The software reportedly includes an Information Resource Manager that was designed to catalog and control people, systems and data components and to thereby become a model of how an organization operates.

The Pride-ASDM package is available for users of IBM, Honeywell, Inc., Digital Equipment Corp., Hewlett-Packard Co. and a variety of other computer systems. The price for the enhanced version of the product is $80,000, the vendor said from 1248 Springfield Pike, Cincinnati, Ohio 45215.

Insurance Package Targets IBM Users

GREAT NECK, N.Y. — A claims processing software package for property and casualty insurance companies using the IBM System/38 computer has been released here by The Wheatley Group, Ltd.

The Automated Insurance Management System (Aims-I) is offered by the vendor as a stand-alone system or integrated with a complete policy management system.

Aims-I is an on-line, interactive, integrated data base software package designed to process insurance claims and reduce document handling, according to the vendor. It reportedly features functional menus, editing capabilities, prompting and error messages, while providing data and application security and audit trails.

Aims-I supports personal and commercial lines for automobile, homeowners, surety bond, general liability, assigned risk, workmen's compensation and mobile home insurance coverage. Applications include claim/claimant and reserve processing, manual and automated drafts, salvage, subrogation, cash receits, reinsurance and bureau reporting.

The package is priced at $40,000 from The Wheatley Group at 505 Northern Blvd., Great Neck, N.Y. 11021.

Enhanced Printing Program Out

SEATTLE — International Entry Systems, Inc. has introduced an enhanced version of its Print 2 peripheral printing program for the vendor's Datacorder II intelligent terminal.

Among the features of Version 2 of Print 2 are a configurable option that allows null characters to be removed from the incoming data stream and a configurable default for the track A and B selection.

If track B is to be printed regularly and if so configured, the operator need only press Enter in response to the track-select question, the vendor said.

The package is available for $100. An upgrade for the first version costs $50 from International Entry Systems at 408 N.E. 72nd St., Seattle, Wash. 98115.

Disk-Based 'ESS' Now Available

REDDING, Calif. — Sheppard Software Co. has introduced a disk-based version of its Event Scheduling System (ESS) software for users of Tektronix, Inc. 4050 series Graphics Computer Systems.

ESS is a project scheduling package that has been available in a tape-based version.

It is an interactive menu-driven package with outputs that include network diagrams, Gantt charts and schedule reports. Graphics outputs and reports can be drawn on the display screen, a flat-bed plotter or a screen/hard-copy device.

Enhancements reportedly include support for zero-duration dummy activities and easier, faster network manipulation.

The disk version of ESS is available for $1,750 from Sheppard Software, 4750 Clough Creek Road, Redding, Calif. 96002.

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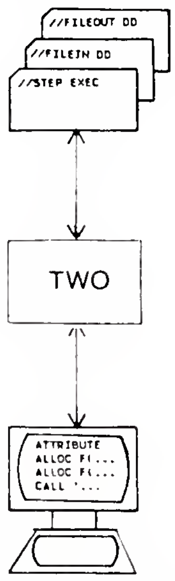

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"Why did Lanier decide to support SNA?"

"Simple. Because SNA is IBM's existing standard, in use today by hundreds of companies. By selecting a widely used architecture philosophy, we have eliminated the biggest problem in establishing an office automation network—compatibility. So our systems act as just another node in your existing communications network. You can forget about communications and just configure the best systems for your company's applications."

"How does Lanier connect to my IBM mainframe?"

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"But isn't SNA compatibility difficult and time-consuming to implement?"

"Not for Lanier. We use a layered architecture that we developed for distributed processing. With this layered architecture, the bridges to your IBM mainframe are straightforward and cost-effective. Because Lanier architecture is already similar to SNA, implementing SNA is not a major effort for us."

"How does Lanier implement the SNA protocols?"

"Internally, Lanier resource sharing treats every process as an LU4. The Lanier bridge functions as a PU2. Then, from the

©1982 Lanier Business Products, Inc.

Foreign Exchange Package Offers Trading Support to Banks

NEW YORK — Index Systems, Inc. has announced a foreign exchange software package that reportedly offers comprehensive on-line trading and operations support to the banking industry. The software system operates on the Digital Equipment Corp. PDP-11/70 minicomputer and the VAX-11 series of superminicomputers.

The software was designed by Bankers Trust Co. for banks and branches that process 200 to 1,500 foreign exchange transactions per day. It also includes an accounting module that features true multicurrency accounting with reporting in the local currency of the branch, the head office and the currency of the transaction/position.

Other features include: on-line inquiries and real-time filing updating, full control over positions and limits, automatic production of documents and cables, automatic monthly revaluations of trading positions and multibank capabilities for sharing computer resources.

The PDP-11 version of the package costs $150,000, and the VAX series version costs $190,000 from Index Systems, 5 Cambridge Center, Cambridge, Mass. 02142.

Financial Package, Generator Available for VAX-11 Users

OKLAHOMA CITY, Okla. — A complete package of financial and accounting software has been made available for the 32-bit Digital Equipment Corp. VAX-11 computer line by International Turn-Key Systems here.

Facs-11 reportedly contains all the normal accounting functions plus the features necessary to perform oil and gas accounting, general and limited partnerships, investment funds and job costing. It utilizes DEC's general accounting package — Dibs-11 — and is written in Dibol.

Dibs incorporates general ledger, accounts payable, accounts receivable, payroll, inventory and order entry/invoicing. The specialized features are also written in VAX-Dibol and are fully integrated with Dibs. The oil and gas modules include joint-interest billing, revenue disbursements, cash-flow analysis, lease management, drilling, production, depreciation and depletion and more.

Also available is MPG-11, a VAX-Dibol program generator to create file maintenance programs, which includes utilities for screen formatting, record layout and create/change/delete programs. It costs $3,500, according to the vendor.

Facs-11 is priced at $60,000 from the vendor located at Suite 101, 1900 N. MacArthur Blvd., Oklahoma City, Okla. 73127.

'Scribe' Updated For VAX-11/730

PITTSBURGH, Pa. — Unilogic, Ltd. has introduced an updated version of its Scribe document production software, this one aimed at Digital Equipment Corp.'s VAX-11/730 superminicomputer.

Scribe was designed for applications involving complex written documents and can handle the production of reports, financial summaries, manuals and proposals, as well as book-length manuscripts.

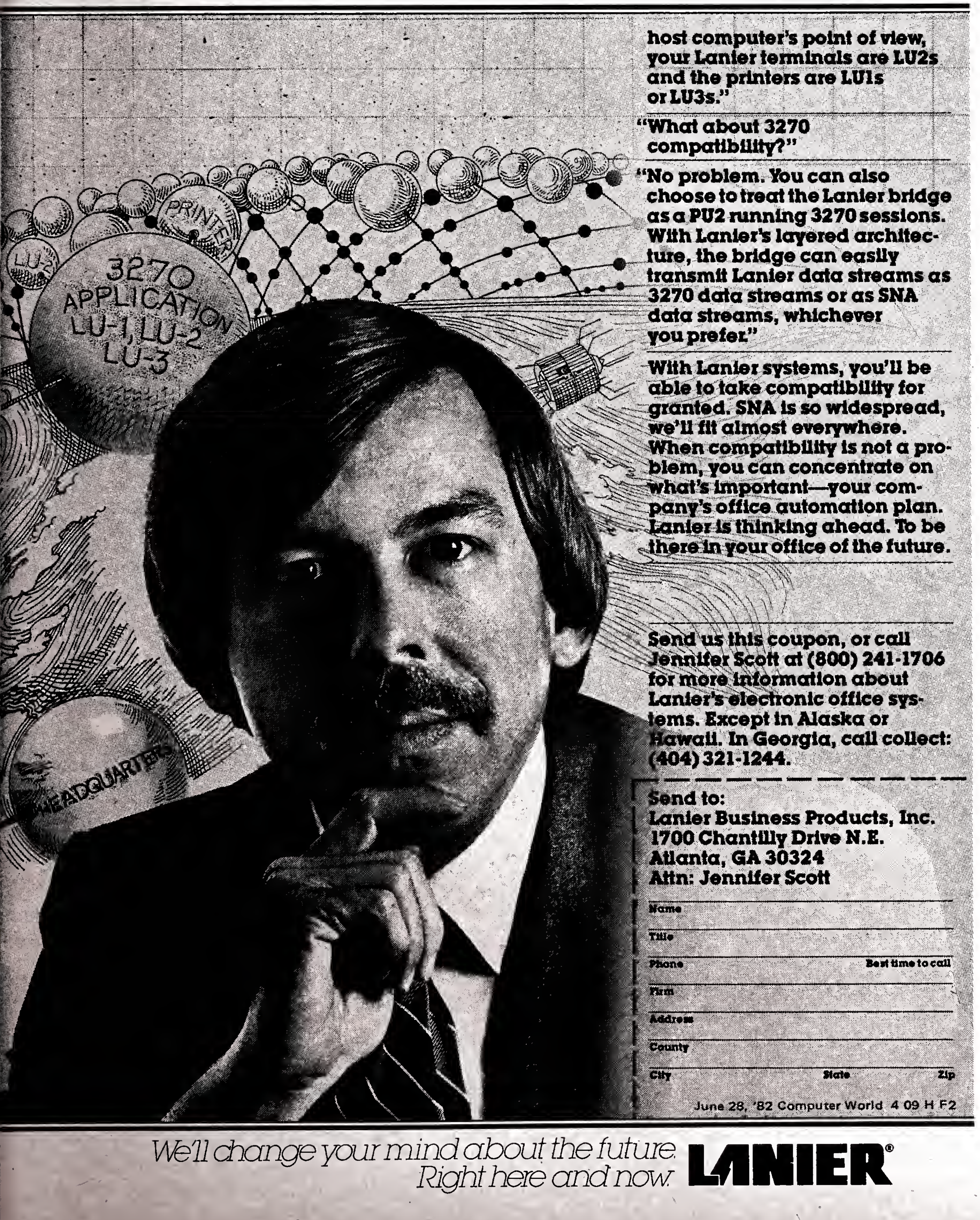
Previous Scribe issues have been unveiled for DEC's VAX-11/750, 11/780, Decsystem-10 and Decsystem-20 computers, a spokesman said.

A single-processor perpetual license fee for the VAX-11/730 costs $12,500 for a commercial site and $7,500 for an educational user. It is also available for additional processors at the same site for 20% of the original license fee.

Unilogic is located at 160 N. Craig, Pittsburgh, Pa. 15213.

"As compatible as equivalent IBM systems."

Marvin Gaines, Director, Data Communications, Electronic Office Systems Division



host computer's point of view, your Lanier terminals are LU2s and the printers are LU1s or LU3s."

"What about 3270 compatibility?"

"No problem. You can also choose to treat the Lanier bridge as a PU2 running 3270 sessions. With Lanier's layered architecture, the bridge can easily transmit Lanier data streams as 3270 data streams or as SNA data streams, whichever you prefer."

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Manhattan Systems Cuts 'GP-10' Subroutine Prices

MANHATTAN BEACH, Calif. — Prices have been cut by Manhattan Systems, Inc. on its package of Fortran graphics subroutines, GP-10.

The GP-10 software runs on Digital Equipment Corp. PDP-11 computers using the TSX or RT-11 operating systems. The price has been reduced from $450 to $99.95. The Fortran version of the package, which can reportedly run on any computer using Fortran, has been reduced from $1,000 to $99.95.

The vendor is located at Suite F, 815 Manhattan Ave., Manhattan Beach, Calif. 90266.

Random Notes

Updated Calendar System Has Interface Capability

MIAMI — Muir & Associates, Inc. has announced a new release of Memo/Follow-up, a calendar system for the IBM System/34 that provides storage and reporting of messages by person and due date.

Release 2.0 is said to allow unlimited messages to be associated with a reference (invoice, project and so forth) and to allow time and dollars spent to be accumulated and reported.

An interface capability said to merge messages automatically from other applications into the system has also been added, according tothe vendor.

The $250 price includes operating manual, diskette and 30-day money back guarantee. The firm is located at 2020 N.W. 96 Ave., Miami, FL 33172.

Harris Data Enhances Accounts Payable Package

MILWAUKEE — Harris Data Service, Inc. has announced Release 1.1 of its Accounts Payable software for the IBM System/34.

The major enhancements include automatic calculation of intercompany due-to, due-from journal entries, automatic detection of last period processing of fiscal year, handling of partial and full payment of a voucher with either computer-generated or handwritten check and additional detail reports.

The software carries a one-time purchase price of $3,500, including source and object code, documentation and 30-day limited warranty. The firm is located at 11629 W. Dearbourn Ave., Milwaukee, Wis. 53226.

Updated Calendar Package Has Interface Capability

CHICAGO — Professional Computer Resources, Inc. has enhanced its Factfinder data base information system with capabilities for accessing and organizing computer information. The menu-driven Factfinder II is said to require no programming to retrieve data stored in the System/34.

The user may now define calculations over an unlimited number of data fields and concatenate up to 10 data fields, calculated fields or constants, the vendor said. Information can be accessed in a variety of formats such as on-screen display or printed report. Vertical bar graphs can be created in either format.

The software can be licensed for $2,995 from Professional Computer Resources, Inc., 2021 Midwest Road, Oak Brook, Ill. 60521.

Tymshare Remote Service Targets Finance Planners

CUPERTINO, Calif. — Tymshare, Inc. has announced Finsystem, a remote computing service aimed at financial planners.

The service includes modules for comprehensive estate planning, tax planning and insurance policy analysis. It also provides tools for analysis of cash-flow budgeting, risk/reward analysis, business valuation, client tracking and market research, the vendor said.

The service is billed on an as-used basis, the vendor said from 20705 Valley Green Drive, Cupertino, Calif. 95014.

Maintenance Controller Fits System/23 Datamaster

GOLDEN VALLEY, Minn. — Elke Corp. has introduced an interactive equipment predictive maintenance package for the IBM System/23 Datamaster. EMS/23 software reportedly allows companies to control maintenance for moving and stationary equipment ranging from cars to steel processing mills.

The system is said to provide identification for each piece of equipment; plan schedules; monitor equipment lubrication, periodic maintenance and safety inspections; and track machine component repairs, exchanges and repair costs.

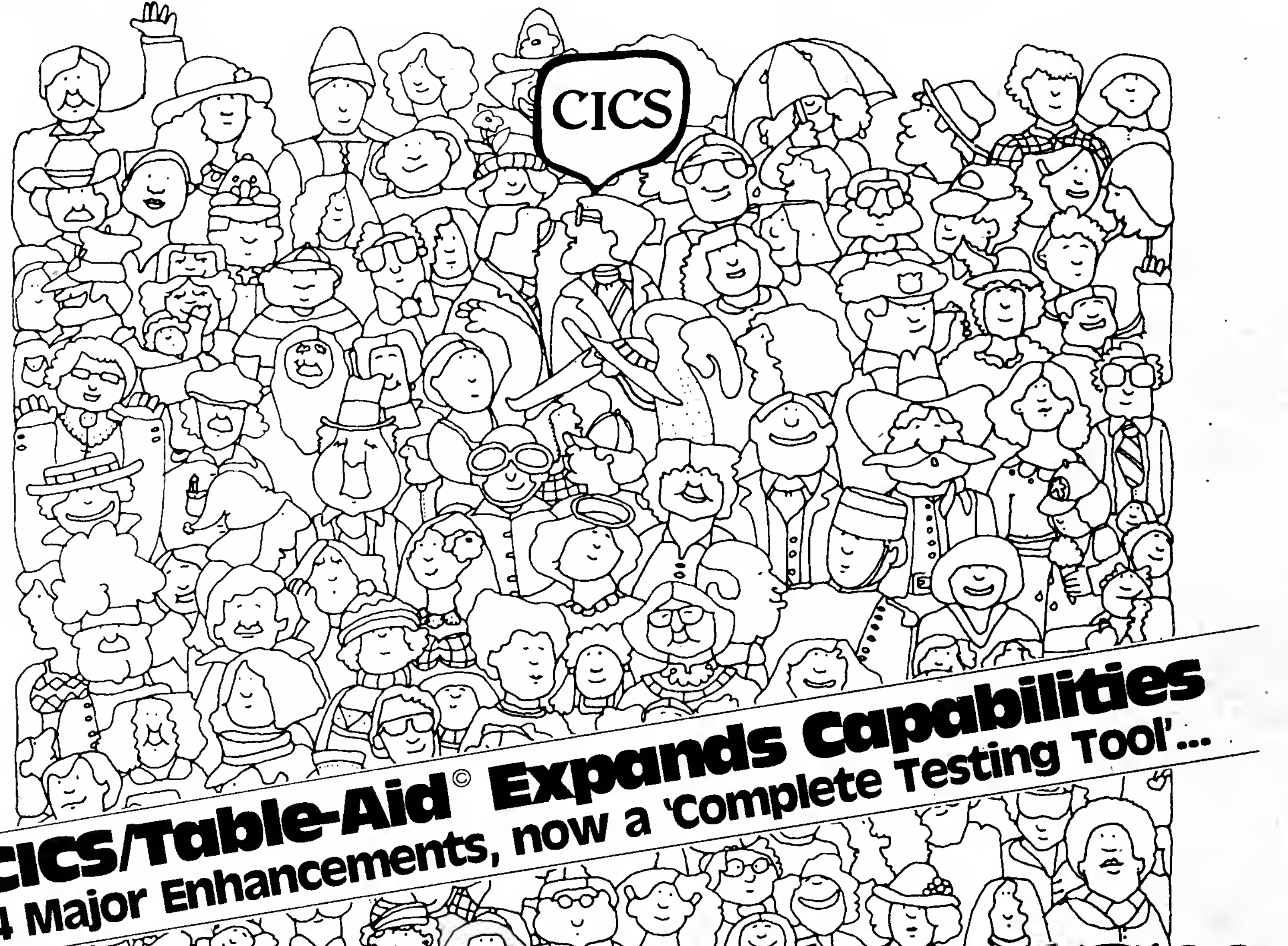
All EMS/23 procedures are run from user menus and data entry is interactive with on-line editing and immediate updating, the vendor said. The package is available for a one-time license fee of $5,000 from Elke, 998 Zane Ave. N., Golden Valley, Minn. 55422.

Health Information Tool Aimed at Datapoint Users

ALLENTOWN, Pa. — Tridata Corp. has announced a health and beauty aids management information system, a software package for distributors using Datapoint Corp. processors.

The package features standard accounting applications, order processing functions and perpetual inventory control. Invoices, packing lists, catalogs, price lists, shelf stickers and individual price stickers can also be produced, the vendor said.

The package costs $15,000, the vendor said from 3057 College Heights Blvd., Allentown, Pa. 18104.



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Connects 116 Buildings

Brown Eyes Quick Return on Local Net

By Phil Hirsch
CW Washington Bureau

PHILADELPHIA — Brown University of Providence, R.I., expects to recoup the entire capital cost of its new local-area network within the first two years of operation, director Harold Webber told attendees at a communications conference held here recently by the Institute of Electrical and Electronics Engineers.

One application of the network, dubbed Brunet, involves management of energy consumption throughout the Brown campus. According to Webber, this system will reduce the university's annual fuel and power bills by $600,000. The trunk cable supporting the Brunet was installed at a total cost of $317,000; $800,000 was invested in additional items, such as wiring for the attached buildings, gateway modems and network control facilities.

The network connects 116 buildings, has more than 600 ports and features two mid-split trunk cables, each 31,000 feet long. Webber estimated that the annual operating cost of Brunet, which began serving its customers last September, is about $150,000. It costs the university about $46 to install an outlet within a building — $26 for hardware and $20 for labor.

Series of Aggravations

Brown decided to install a local-area network "after a long series of aggravations with telephone company-provided data services," Webber explained. Other major motivating factors were the need to connect a rapidly growing campus terminal population and the opportunity to reduce existing costs by installing on-line energy management and security systems.

A private branch exchange (PBX)-based local network was considered, but was rejected relatively quickly, Webber said. A PBX system would not accommodate the local and outside television services Brown wanted to offer. Moreover, there were cost and administrative problems.

As Webber put it, "After obtaining a bid for a sophisticated new digital PBX, which would replace our Centrex telephone service, we began to better appreciate the cost of providing both voice and data with our switch and the complexity of installing and operating our own telephone system.

"We decided that we simply did not want to tackle the combined problems of replacing all of the telephone cable plant and our more than 5,000 telephones, establish our own telephone utility and at the same time change all data communications systems."

Broadband Chosen

Broadband was selected over baseband largely because "networks and services from different vendors can be added incrementally and will operate independently on the same system," Webber explained. He also cited other advantages: broadband components are mass-produced and available from many vendors; the systems are relatively easy to build, separate and maintain; they can encompass "a single building or an entire city"; and the technology offers "exciting possibilities for meeting current and future needs," he said.

The system Brown ultimately chose for terminal-host communications was a Sytek, Inc. Localnet 20 packet network. The Bus interface, which Sytek calls a Packet Communications Unit (PCU), connects terminals and computers "at a cost/port comparable with typical 1,200 bit/sec telephone modems," Webber said.

The Localnet 20 network is accessible to outside users through a modem pool. The modems are connected to telephone lines on one side and to eight-port PCUs on the other. Off-net users dial the modem pool, are routed on to the network and then access the attached time-sharing machines.

To handle outgoing data calls, PCUs connect with two groups of intelligent modems, operating, respectively, at 300 and 1,200 bit/sec. They are linked, in turn, to a Dimension PBX data module that interfaces with the telephone network.

When the Sytek system was first installed, Webber reported, "We experienced a number of annoying problems with flow control and loss of internal buffers."

Univac Boosts PDN Support

BLUE BELL, Pa. — Sperry Univac announced it has expanded its general support for public data networks on its data communications products.

The announcement covers the availability of support for the company's network communications and terminal products through the Nordic public data network in use by Sweden, Denmark, Norway and Finland; Datex-P in West Germany; PSS in the U.K.; Transpac in France; and Datapac in Canada.

Future plans call for the extension of Transpac and Datapac functional support and the addition of initial support for DN-1 in the Netherlands; Telenet in the U.S.; Austpac in Australia; Telepac in Switzerland; and Datex-P in Austria. Delivery of these products is scheduled for 1983, a Univac spokesman said.

Univac can be reached through P.O. Box 500, Blue Bell, Pa. 19424.

IBM 3275 Emulation Package Runs on Color Terminal

ATLANTA — Intelligent Systems Corp. is offering an IBM 3275 emulation package for its Model 8001 color terminal, a color CRT terminal and a new version of its Model 8001G 19-in. color CRT terminal.

The Model 8001 terminal is an intelligent stand-alone unit that can be attached to a host with Binary Synchronous Communications (BSC) protocol. The terminal emulation package allows for an 80-char., 24-line display with an additional status line.

Color control is provided by the 3270 data stream, making the terminal compatible with existing IBM software and customer application programs, a spokesman said.

A system including the 8001 with a 19-in. screen, terminal control software and the IBM 3275 software emulation package costs $4,055. Also included is a sculptured, 117-key keyboard.

The Model IS/2405 color CRT terminal has an 80-col, 24-line color alphanumeric and graphics display and is based on the Intel Corp. 8085 microprocessor. It is priced at $1,200 until Oct. 1. After that date, the price will be $1,995.

The new model of the 8001G features new analog circuitry and switch-selectable 115 or 220 input voltage. It costs $2,870, Intelligent Systems said from Intecolor Drive, 225 Technology Park, Atlanta, Ga. 30092.

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M/A-COM DCC Muxes Offer Net Control Ports

GERMANTOWN, Md. — Two newly developed multiplexers have been introduced here by M/A-COM DCC, Inc. (formerly Digital Communications Corp.).

The Advanced Statistical Multiplexer Model ACM9100 and the Advanced Switching Multiplexer Model ASM9200 reportedly offer all the capabilities of M/A-COM DCC's statistical and switch multiplexers, plus the ports can now be used as a new password-protected network control port, which reportedly provides:

- Performance statistics for network evaluation.
- Diagnostics.
- Multiplexer port configuration status.

They also include user-selectable binary synchronous communications and asynchronous inputs up to 9.6K bit/sec and 32K-byte data buffer, reverse flow control settable/port and enhanced flow control.

The ACM9100 and ASM9200 have options available for Hewlett-Packard Co. flow control, transmission over a satellite link, a back-up data link and asynchronous data link operation. The price of a four-port ACM91100 is $2,450, and a four-port ASM9200 is $3,050.

Further details can be obtained from the vendor at 11717 Exploration Lane, Germantown, Md. 20874.

Soroc Unveils Smart Terminal

ANAHEIM, Calif. — Soroc Technology, Inc. has introduced an intelligent terminal said to include 14 user-programmable function keys. It also provides 128 bytes of memory to provide separate functions.

The microprocessor-based IQ 135N terminal's preprogrammed edit commands include character and line insertion and deletion and a graphics option providing line-drawing capabilities with 11 special graphics characters, the vendor said.

Operation characteristics, including transmission and print delimiters and keyboard repeat rate, can be adjusted to user requirements, according to a Soroc spokesman.

Additional features of the IQ 135N terminal include keyboard lock, 25th status line with a 36-char. user message, block and conventional modes and printer and auxiliary RS-232 ports.

Selectable transmission rates from 110 to 19.2K bit/sec is another feature.

The terminal is available for $1,095 from Soroc Technology, 165 Freedom Way, Anaheim, Calif. 92801.

System/34 Gets Voice Capability

BURR RIDGE, Ill. — Sweeney Computing Corp. has announced the Touch Tone Entry with voice response for its Access/34 Model I system, which allows asynchronous communications for the IBM System/34 user.

Access/34 reportedly allows up to eight asynchronous or voice I/O ports to be controlled with a single System/34 communication line.

Application software is written by the user in RPG-II, according to the vendor.

Touch Tone Entry offers voice or tone prompting and may be utilized for remote order entry, data retrieval, inventory checking, credit checking or check authorization from any Touch Tone telephone.

Access/34 with Touch Tone Entry costs $14,995 for a two-port system. The firm is located at 60 Shore Drive, Burr Ridge, Ill. 60521.

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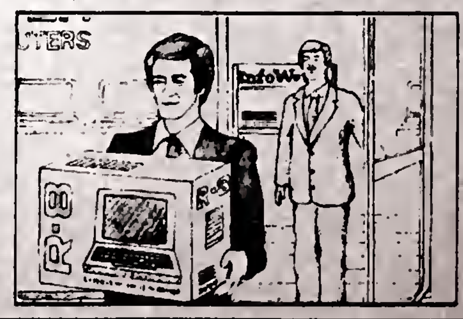

CRT Terminal Introduced For APL Users

SAN JOSE, Calif. — An interactive CRT terminal for APL users is available from Anderson Jacobson, Inc.

The AJ 520/A recognizes 70 standard and up to 128 user-defined overstrike characters that provide versatility for programmers.

The CRT terminal is an Ansi standard, 132/80-col display with detachable keyboard, extra large letters on a 15-in. screen, four pages of set-up menus in plain English and 24 user-programmable function keys.

In addition, it offers memory expansion to 21K bytes, bidirectional scrolling, optical filter for added glare reduction, video output connection for external monitor and a printer port connection.

The AJ 520/A costs $2,380 from Anderson Jacobson at 521 Charcot Ave., San Jose, Calif. 95131.

Terminals Get Graphics Boost

SACRAMENTO, Calif. — Digital Engineering, Inc. has introduced a series of enhancements for their Retro-Graphics terminals. The enhancements were designed for users who want to convert their present alphanumeric terminals to full graphics capability and operate them without burdening the host computer, the vendor said.

The Retro-Graphics line, Gen. II, features built-in intelligence on printed circuit boards that can be installed at the user location. Other features include bit-map graphics, CRT resolutions to match application needs and performance based on standard Tektronix, Inc. protocol.

A cross hair cursor mode is standard on all upgraded terminals enabling the user to plot points directly into the computer, the vendor said.

The cost of Retro-Graphics terminals is $1,150 from Digital Engineering, Inc., 630 Bercut Drive, Sacramento, Calif. 95814.

Portable Teleprinter Aids Insurers

ATLANTA — Computone Systems, Inc. has introduced a portable printer/terminal, capable of stand-alone processing.

The SST weighs 18 lbs. and reportedly enables insurance agents to provide point-of-sale financial and insurance planning services by inserting into the terminal preprogrammed plug-in computer circuit boards, called program pacts. The system operates on-line with Computone's data center in Atlanta to provide access to a data base including financial planning programs and information from over 3100 insurance policies offered by over 240 companies.

This product is built into a traditional attache case and features an impact printer. The SST is base-priced at $3,295, which includes templates, instruction manuals and one week of training. Program pacts are $200 each, the vendor said from One Dunwoody Park, Atlanta, Ga. 30338.

Features 10-Ft Display

CRT Screen Boasts Readability at 60 Feet

CHERRY HILL, N.J. — Telegenix, Inc. has introduced a CRT terminal that is said to be 10 times the size of those commonly used today. The 10-ft. flat-panel device offers a full computer screen that is readable at a distance of 60 feet or more.

The TDS2000 display is part of a modular product line in which the basic unit is two lines of 16 characters each. The vendor manufactures these units and packages them to form diplays as large as the 1,920-char. TDS2000 terminal. Potential users for the terminal are in the following industries: manufacturing, transportation, communications, utilities, wholesale, finance and government.

The price range of the display is from $5,000 to $55,000, and options for interfacing to communications equipment and host computer systems are available. More information can be obtained by contacting Telegenix, Inc., 26 Olney Ave., Cherry Hill, N.J. 08003.

Lear Siegler ADM 22 Bows

ANAHEIM, Calif. — Lear Siegler, Inc.'s Data Products Division has introduced its ADM 22 CRT terminal.

Functionally, the new ADM 22 retains a mixture of features found in the firm's ADM 3 and ADM 5 dumb terminals and the ADM 31 Intermediate terminal, according to the vendor.

Key features on the ADM 22 include complete visual attributes, seven function keys, full editing capabilities, a status line, block mode transmission and graphics mode capability.

The new terminal was developed jointly by Lear Siegler and Teco Electric & Machinery Co., Ltd. of Taiwan. It is priced at $695.

The company is located at 714 Brookhurst St., Anaheim, Calif. 92803.

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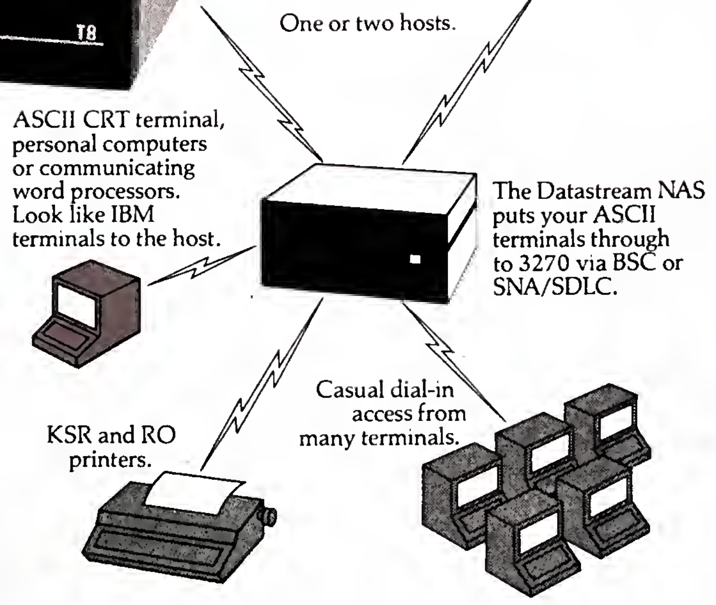
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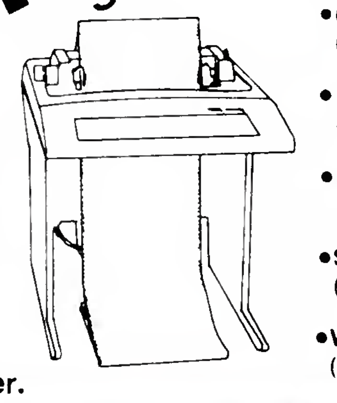

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Emulex CS11 Mux Series Extended

SANTA ANA, Calif. — Emulex Corp.'s CS11 series of multiplexers for the Digital Equipment Corp. PDP-11 and VAX-11 have been extended to include the LSI-11 family of microcomputers.

The CS01 Communication Multiplexer series comes in two versions — the CS01/H and CS01/Z, which emulate the DH11 and DZ11 multiplexer systems from DEC.

Both models are said to permit the concentration of up to 64 asynchronous communications lines on a Q-bus while taking up the space of four lines in a DEC system.

A basic eight-line CS01 system costs $3,500 while a 16-line system costs $4,500. A distribution panel with an eight-channel line adapter costs $2,000 and additional eight-channel line adapters — RS-232 or current loop — cost $1,000.

Emulex is located at 2001 E. Deere Ave., Santa Ana, Calif. 92705.

Uninet OKs Comten X.25

ST. PAUL, Minn. — In a recent joint announcement, NCR Comten, Inc. and Uninet, Inc. said that the Comten X.25 interface has been accepted and certified by the Uninet Packet Switched Network.

This certification allows users of Comten 3600 Communications Processing Systems to attach their terminals to the Uninet network available in over 170 U.S. metropolitan areas and 31 other countries.

In addition to the Uninet certification, the Comten X.25 interface has been accepted or certified by six other public data networks: Tymnet, Inc. (U.S.); Telenet, Inc. (U.S.); British Postal Service (U.K.); Transpac (France); Datapac (Canada); and Datex-P (Germany).

The X.25 interface costs $48/mo; NCR Comten is based at 2700 Snelling Ave., St. Paul, Minn. 55113.

IDS Introduces Two Test Sets

LINCOLN, R.I. — International Data Sciences, Inc. (IDS) has introduced two communications test sets.

The Hawk 4030 can test a modem or terminal, features a 20-char. data display and weighs 12 lb. The programmable unit performs test routines on synchronous, asynchronous and isochronous systems at data rates up to 19.2K bit/sec, IDS said.

The microprocessor-based Model 67/60 combines a full-function bit error rate tester, polling test, echo test and Fox and User message generator with an RS-232C, V.24 breakout and monitor panel. Asynchronous and synchronous tests can be performed at 50 to 19.2K bit/sec.

The Hawk 4030 costs $3,995, and the 67/60 costs $995 from IDS, 7 Wellington Road, Lincoln, R.I. 02865.

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All the switches and indicators needed to program and control BABYMUX's data transit system are right on the front of the device, so you don't have to open the mux to fool with DIP switches. And you don't need an auxiliary terminal, either. You can even use your local mux to program port parameters at the remote end of the line.

BABYMUX's unique status display indicator system also reveals a wide variety of traffic conditions, including percentages of line use, error rates and problem alerts—all of which can be observed from across the room. And BABYMUX's user-selectable diagnostics include a test message generator that checks out terminal configurations without detouring through the host computer.

MORE MUX FOR THE MONEY

BABYMUX is field-upgradable from 2 lines to 5 or 8 lines for modest incremental costs. The basic 2-line version is just $1350. A $475 plug-in circuitboard makes it a 5-line mux. And another for the same price makes it an 8-line mux. So you get the muxes you need, when you need them, without the high costs you would expect. Test drive a BABYMUX, today.

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By Users of Low-Cost Systems

CAD/CAM Features Rated Over Price

By Tim Scannell
CW Staff

FRAMINGHAM, Mass. — Are users of low-cost computer-aided design and manufacturing (CAD/CAM) systems — those systems generally priced under $100,000 — attracted by the systems' price or their functionality?

Not surprisingly, a large number of users buy these computers because of their low cost in relation to other CAD/CAM equipment. But, the majority turn to the lower priced models for their capabilities, according to a report just released by International Data Corp. (IDC).

The 72-page report, entitled "The Low Cost CAD/CAM Systems Market," also notes that:

- Most small CAD/CAM systems are used for printed circuit board design, with about 15% utilized for "big system" jobs like mechanical design and drafting.
- More than half of today's users acquired their systems as recently as last year — which seemed to be a boom time for the smaller systems. Thirty-six percent bought their computers in 1980 and only 4% of the users surveyed installed small CAD/CAM equipment in 1982.
- More than 70% of the users queried by IDC are "very satisfied" with the operation of their systems, while less than 10% had second thoughts about their systems' capabilities. However, almost one-third of the users surveyed desired improved systems speed and response time, the report noted.

How Figures Computed

To arrive at its figures, IDC surveyed 50 CAD/CAM systems users — 25 that presently have small CAD/CAM systems and 25 that do not, but work for companies that deal in applications similar to those of small system users. Users of large-scale CAD/CAM systems were not included in the nonuser sample, the report said.

The majority of the users surveyed are computer equipment manufacturers, while the rest are split among civil engineering, machinery manufacturing, test equipment or instruments, architectural and integrated circuit design companies. About 16% of the users questioned are involved with the aerospace, hybrid design, printed circuit board and tool design and educational industries, the report

(Continued on Page 54)

Application	Percent of Revenues by Customer Organization Commercial Employment — Size Class Under 250	250-999	1000 or more	Educational	TOTAL
			1981		
PC Board	22%	17%	11%	—	50%
IC Design	1%	—	1%	—	2%
Architectural	28%	6%	—	—	34%
Mechanical Design	11%	3%	-	—	14%
TOTAL	62%	26%	12%	0%	100%
			1986		
PC Board	15%	4%	3%	2%	24%
IC Design	5%	2%	6%	4%	17%
Architectural	14%	14%	3%	3%	34%
Mechanical	13%	7%	3%	2%	25%
TOTAL	47%	27%	15%	11%	100%

Source: IDC

Low-Cost CAD/CAM Market Mix by Application and Customer Type (1981 and 1986)

Company Type	Percent of Sample
Computer Equipment Manufacturing	26%
Civil Engineering	16%
Machinery Manufacturing	12%
Test Equipment/Instruments	12%
Architectural	10%
IC Design Service	8%
Hybrid Design Service	4%
Aerospace	4%
Educational Institutions	4%
PCB Design Service	2%
Tool Design	2%

Source: IDC

Types of Companies Represented in Sample

CRDS Adds Three to Universe Line

NATICK, Mass. — Charles River Data Systems, Inc. (CRDS) has added three systems priced under $25,000 to its Universe 68 line of 32-bit computers.

The Universe 68/27 costs $16,700 with 256K bytes of main memory, 16M bytes of Winchester disk and 1M byte of floppy disk. Adding CRDS' Bell Laboratories' Unix-compatible Unos operating system — with an unbundled price of $3,000 — brings the price to $19,700.

The Universe 68/37 computer with 256K bytes of random-access memory (RAM), a 32M-byte fixed disk and a 1M-byte floppy disk costs $18,300.

Model 68/47

The Model 68/47 — including 512K bytes of RAM, a 32M-byte fixed disk and 10M bytes of removable Winchester disk memory — costs $23,600.

The prices are about 15% below previously available Universe 68 models with similar capabilities, CRDS said. Price reductions have been made possible by the introduction of higher density, 256K-byte and 512K-byte main memory boards and Winchester disk technology, according to the firm.

CRDS is located at 4 Tech Circle, Natick, Mass. 01760.

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CAD/CAM Features Rated Over Price Report

(Continued from Page 53)

pointed out.

The CAD/CAM systems highlighted in the survey cost $100,000 or less, but could be priced up to $180,000 when fully configured with software and peripherals. All of the systems include a processor, a graphics display, auxiliary storage, an input device or devices and an optional hard-copy device.

In 1981, about 580 low-cost CAD/CAM systems were installed in the U.S. with a value of about $35.8 million. This represents about 5% of the total CAD/CAM market. These figures are expected to jump to 10,600 units and $543.5 million by 1986, capturing 20% of the total CAD/CAM market revenues, the report said.

Mini-CAD/CAM systems users in the survey considered a number of variables in selecting their equipment. First, most identified the equipment that most met their applications needs. Once the noncontenders were weeded out, the users brought systems cost into the picture. Finally, the users considered ease-of-use and applications features, the report said.

The systems vendors echo the users' needs. Most manufacturers rate cost, ease-of-use and functionality as the three top system features.

While the majority of the users in the survey are happy with their small CAD/CAM systems, the survey did spotlight areas that could use improvement.

For instance, software improvements could be made in the systems' auto routing, numerical control tape generation, data base management and ease-of-use functions. On the hardware side, vendors could improve systems by adding larger color displays, incorporating better digitizing, adding rigid disk storage and improving hard-copy output, the IDC report showed.

However, although most of the users in the survey do not have an annual CAD/CAM equipment budget, 62% plan to buy more low-cost hardware and software, while 12% are considering larger CAD/CAM systems.

The report, one of a series prepared by IDC's Computer Graphics Industry Service, costs $2,500. The fee for joining the graphics service, which provides continuous industry updates and other research activities, is $9,000 yearly.

Additional information is available from the research firm's Pacific Technology Center, Suite 101, 1448 15th St., Santa Monica, Calif. 90404.

PE Unveils Turnkeys With 'Cadam'

OCEANPORT, N.J. — Perkin-Elmer Corp. has introduced four turnkey systems for the computer-aided design and manufacturing (CAD/CAM) marketplace based on the firm's family of 32-bit superminicomputers and Computer-Graphics Augmented Design and Manufacturing (Cadam) software, licensed by Cadam, Inc.

The Cadam system is an interactive, general-purpose, three-dimensional design and drafting system containing analytical design aids for use in design drafting, numerical control processing and other engineering or manufacturing applications, the vendor said.

A single terminal workstation from Perkin-Elmer reportedly includes a Series 3200 supermini with 2M bytes of memory; a floating-point processor; a console terminal; an 80M-byte disk; a graphics terminal with keyboard, light pen and function keys; and a worktable with chair. This system is priced at $160,000.

A two-terminal workstation includes 4M bytes of memory and is priced at $220,000, according to a vendor spokesman. A three-terminal workstation is priced at $260,000; a four terminal workstation is $300,000.

Perkin-Elmer is located at 2 Crescent Place, Oceanport, N.J. 07757.

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HP 2680 Laser Printer Gets Graphics Capabilities

PALO ALTO, Calif. — Hewlett-Packard Co. has enhanced its HP 2680 laser printer with office graphics capabilities.

Especially useful for organizations that produce business reports and technical documents, these graphics capabilities reportedly eliminate the need for typesetting, paste-up, vendor printing and collating.

The HP 3000 Business Computer System is used to design graphics, combine them with text and merge both into a completed document that is then printed under the computer's command on the 2680 laser printer.

Three basic steps are involved in the electronic printing of text and graphics.

The first step, production of graphics, is made possible through the use of graphics option hardware and new graphics software packages. With this software, the user can produce illustrations such as graphs, organization charts, flow charts or schematics that can then be merged with text and printed simultaneously on the same printer.

The text portion of the document is produced using the vendor's TDP/3000 text- and document-processing software. Text is entered into the system, edited and formatted with TDP/3000.

The final stage, merging text and graphics into a finished document, uses TDP/3000 software and the laser printer. Graphics can be sized and positioned on the page as the user wishes, while being merged with text to produce the final document. This is then printed by the laser printer at 45 page/min.

The HP 2680 laser printer costs $92,000. The graphics package for it costs from $19,250 to $35,250, HP said from 3000 Hanover St., Palo Alto, Calif. 94304.

Attached Processor Out for F/4000

MOUNT LAUREL, N.J. — Formation, Inc. has announced an attached processor (AP) capability for its F/4000 computer system. The AP is said to provide increased throughput and response time "at a fraction of the cost" of duplicating an entire system. The AP "splits" processing jobs with the system's primary CPU, according to the firm.

The primary CPU handles all I/O tasks, but all other tasks reportedly can be processed by either the primary CPU or the AP on an as-available basis.

Because the AP is also part of the F/4000's fail-soft architecture, if the primary CPU fails the F/4000 can reconfigure itself and designate the AP as the primary CPU, the vendor said.

Because the AP shares the same electronics as the system's disk controller, it can also be configured as a disk controller if needed, according to the firm.

The F/4000 is a 32-bit computer system said to be program-equivalent to the IBM 370.

The AP is available with all three F/4000 models (100, 200 and 300) or as a field upgrade. It is supported under IBM's VM/370 and VM/SP operating systems.

For users with two CPU modules, the AP feature costs $15,000, a spokesman said from Formation, 823 E. Gate Drive, Mount Laurel, N.J. 08054.

Workstations Offer Graphics

CHICAGO — Cadlinc, Inc. has introduced a series of desktop graphics workstations that reportedly feature high-resolution bit-mapped graphics.

The Cadlinc graphics computers support stand-alone and host computer environments as well as distributed data processing, the vendor said. The systems feature the computing power of the Motorola, Inc. MC 68000-based processor, a 1,024 by 792 pixel landscape-mode raster graphics display, a detachable keyboard, a mouse pointing device and a bit-mapped graphics controller.

Software support under Bell Laboratories Unix operating system is provided for all models in the series. The system provides 256K bytes of memory.

The Cadlinc graphics controller board provides a 1,024 bit by 1,024 bit dual-port frame buffer with 1,024 by 792 bits of visible display area. The remaining bits can be used as a cache for font storage and graphics symbols, the vendor said.

The workstations are available in three models for between $8,500 and $22,500 from Cadlinc, Inc., 8600 W. Bryn Mawr Ave., Chicago, Ill. 60631.

Disk Driver Adapts CP/M to Multibus

PLYMOUTH, Minn. — Computer Products Corp. has announced a Winchester disk driver that is said to adapt Digital Research, Inc.'s CP/M 80 and CP/M 86 operating systems for use on Intel Corp. Multibus systems.

The CP/M software can be written for either hard or floppy disks.

The CP/M driver costs $90. Computer Products is at 2415 Annapolis Lane, Plymouth, Minn. 55441.

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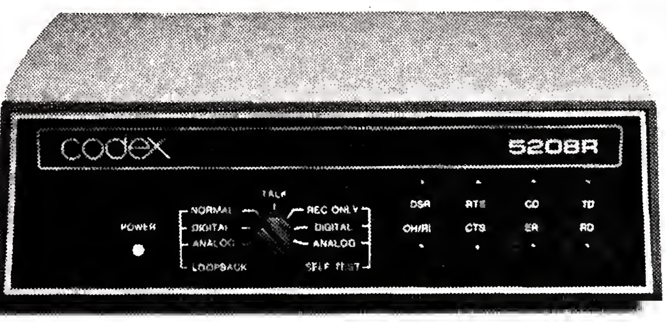

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DEC Offers Video Workstations For 32-Bit VAX CPUs

MAYNARD, Mass. — Digital Equipment Corp. has announced the first in a family of video workstations for use with its VAX 32-bit computers.

The Vaxstation 100 is said to support high-level graphics functions and text manipulation for general purpose and technical applications. The subsystem includes a 19-in. raster display, 103-key keyboard, local display processor with display buffer and a pointing device.

The Vaxstation 100 connects via fiber optics to any VAX computer system through a Unibus interface that will support two workstations.

The system with Unibus interface costs $10,550. A second system, without the Unibus interface, costs $9,550. An optional graphics tablet costs $1,700.

DEC is located at 129 Parker St., Maynard, Mass. 01754.

Emulex Has Swap Program For PDP-11, VAX-11 Users

SANTA ANA, Calif. — Emulex Corp. has announced an exchange program for users of Digital Equipment Corp. PDP-11/70 and VAX-11 computer systems who wish to swap other non-DEC disk controllers for Emulex units without losing their investment in the disk drives.

Under the new program, end users of PDP-11/70 and VAX-11/750 and 11/780 computers may qualify for exchange credits on an Emulex or other non-DEC disk controller that can be applied toward the purchase of a higher performance Emulex SC71, SC750 or VAX-Master/780 disk controller. The user's SMD-compatible drives can reportedly be left in place and used with the new Emulex controller. Emulex will provide installation services and can give the user a system or subsystem maintenance contract from Control Data Corp. or other qualified service organization.

According to an Emulex spokesman, users who now have a non-DEC, non-Emulex controller/subsystem installed will be able to receive liberal trade-in allowances: $3,500 for a controller installed on either the VAX-11/750 or 11/780 Unibus, $3,750 for a controller installed on the PDP-11/70 cache bus and $6,000 for a controller installed on the VAX-11/750 standard bus interface.

Further details on the exchange program are available from Emulex headquarters at 2001 E. Deere Ave., Santa Ana, Calif. 92705.

Via Develops Graphics System For Chip Design

NASHUA, N.H. — Via Systems, Inc. has introduced an interactive graphics system for integrated circuit mask design and manufacturing applications.

The Via Series 100 reportedly interfaces directly with other integrated circuit design systems' data and can be used either as a stand-alone design system or linked to distributed networks with other Via Systems and/or larger machines. The complete Via Series 100 system includes a Digital Equipment Corp. LSI-11/23 minicomputer with 256K bytes of main memory, a 35M-byte Winchester disk drive and a 17M-byte 6400 bit/in. tape cartridge; a design station including an alphanumeric terminal with user-programmable function keys, an 11-in. by 11-in. data tablet for on-line design and a graphics processor, video controller and a 19-in. 60-Hz color monitor.

This system is base priced at $90,000, and Via is located at 11 Concord St., Nashua, N.H. 03060.

Bar Code Reader Runs as Stand-Alone

FRANKLIN, Mass. — Identicon Corp. has introduced the Model 6026 bar code reader, packaged with a self-contained power supply to serve as an integrated stand-alone terminal.

The reader uses circuitry that provides automatic bar code selection of up to five distinct bar codes by means of multiple resident decoders. It features connectors for a badge reader, light pen and remote speaker, according to the vendor.

The reader is available for $1,000 from Identicon, 1 Kenwood Circle, Franklin, Mass. 02038.

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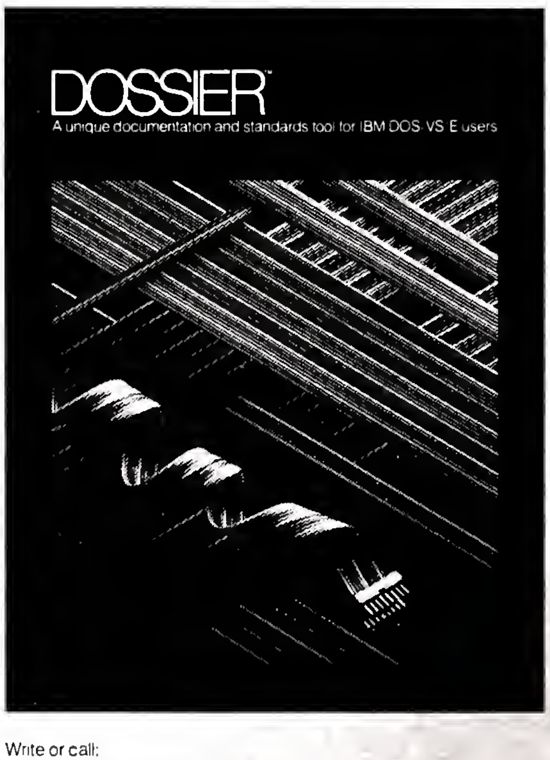
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SPECIAL**REPORT**

Systems and Utility Software: Weighing the Alternatives

CW Photo by S. Blakeney

Edited by Lois Paul

June 28, 1982

COMPUTERWORLD
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Advice From Consultant

In the Market? 'Look at What Others Buy'

By **Lois Paul**
CW Staff

"Look at what other people are buying." That was the major advice regarding system software selection from Julian Brandes of Systems Programming Ltd. in Walnut Creek, Calif., at a recent software conference here.

"If you decide not to buy what other people are buying, you must be very sure of your decision," Brandes said at a recent conference here.

Avoid the buzzword trend, Brandes advised, noting, "You don't have to have a relational data base." He also suggested that companies can save a lot of effort by working out their requirements on paper before salesmen start knocking on their doors.

"I have found that the most critical area in the selection of software is to remember the objective," he said. His preference is to absent himself and other persons from the evaluation of any system software products with which they already are familiar. "I also prefer not to have fairly new employees on the evaluation team," he added, noting that management cannot be certain of their motives or the objectivity of their decisions.

Critical Selection

The selection of system software is not only critical as an investment in that particular package, but also as an investment in existing software and systems. Brandes said that the first step in the selection process is identification of the problem. A company cannot make a proper selection unless it is in terms of a desired result.

"Don't forget the long term all the way through the selection," he cautioned, stressing it is important to remember both the short- and long-term problems that will be affected by the system software that is chosen.

The second step is to determine how critical the decision is, according to Brandes. The factors affecting this factor include the initial outlay costs, future costs and, most critical, "the payoff." This determines how critical the applications are that will be affected by the system software package selected.

It is necessary to gauge how flexible the decision is, based on the extent of maneuverability the firm has if the particular package chosen turns out to be the wrong one, he said.

The next step is a list of criteria on the vendor, anticipated resource utilization, ease of use and design characteristics and facilities, Brandes explained, noting that companies may want to assign weighing factors or scores for each of the categories and their subcategories.

Under vendor criteria are questions regarding the stability of the vendor firm, its track record, the level of support available and how convenient it is. Brandes said other questions cover the position of the vendor in the market with this product, whether it has formed a user group and what its ongoing development activities and plans are for the product.

Resource requirements encompass purchase price, implementation cost, maintenance cost, CPU, memory and disk overhead. "This may consume the greatest part of the evaluation process, for example, with a data base management system," he said.

Under ease of use, questions revolve around what is involved in the installation process, ongoing user ease of use, the user interface, documentation and training.

General Characteristics

Although design characteristics and facilities largely depend on the particular packages, Brandes suggested that potential buyers look at general characteristics such as operating system requirements of the packages, hardware requirements and upward compatibility from version to version. As a first step with regard to this category, users should consult the significant body of literature that addresses areas such as data base management systems (DBMS), teleprocessing monitors and languages.

Brandes said it is important to avoid elevating certain criteria in importance that basically are quantifiable. Potential users can spend months analyzing performance expectations. However, they must recognize that this is only one part of the evaluation. The fact that they spent more time on this part should not give it a disproportionate amount of weight when it comes to making the final decision. "After spending time, keep it in perspective," he advised.

The maturity of the products being considered is a key factor, he noted. "If you are going to push a package to the limits of its capabilities, you are moving toward the area of bugs," he said, adding that users will stand a better chance with a mature product.

Programming System Helps Single Store Compete With Large Bookstore Chains

CARMEL, Calif. — One of the best ways for an independent store owner to compete with large chain stores is to computerize its office operations.

The most expensive part of the computer system, however, is usually the application software required to perform the recordkeeping and data inquiry tasks.

The management of the Thunderbird Bookshop and Restaurant in this northern California resort community has solved this problem by using a programming system to generate the 50,000 lines of application code required to automate their inventory, purchasing, invoicing, sales and special recordkeeping functions.

The entire system reportedly was developed in six months, document-

(Continued on SR/10)

Marc Waldroup, the Thunderbird Bookshop's DP manager, scans a price/inventory code label on a book sale. The terminals are used by sales clerks to query files in the store's book data system.

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Boom Seen in Utility, Systems Software Sales

By Lois Paul
CW Staff

FRAMINGHAM, Mass. — Worldwide revenues for systems software products will increase from $1.3 billion in 1981 to $5.2 billion in 1986. Utility software revenues will reach $6.5 billion in 1986 from $1.4 billion in 1981.

These predictions are included in *The Packaged Software Statistical Reference Book* published by International Data Corp. (IDC) here.

"Growth in systems software will be spurred by the tremendous interest in sophisticated operating systems, language compilers and in communications software," IDC reported. "Productivity tools for programmers and data management and graphics will continue to influence the utility software market," the researchers added.

IDC foresees a strong performance by the hardware manufacturers in packaged software over the next five years (Figure 1), and the largest portion of this will be from systems software, which is expected to increase from $1.1 billion in 1981 to $4.5 billion in 1986. Utilities software follows closely with $805 million in revenues in 1981 increasing to $3.4 billion in 1986. In systems and utility software from hardware manufacturers, operating systems, communications and word processing were the most popular packages, the report indicated.

Smallest Area

On the other hand, the systems software market is the smallest competitive area for the independent software suppliers, according to IDC. With revenues of $195 million in 1981, this market is expected to grow at 31% to reach $750 million in 1986 (Figure 2). The report noted the strong presence of micro software companies in the top 10 of independents providing systems software because of their operating system and language offerings.

In the independent utility software market, graphics packages are expected to experience the strongest growth at 54% compounded annually. Report generators and data management systems will follow at 45% and 38%, respectively, the researchers concluded.

IDC has projected revenues of $1.5 billion for data management packages in 1986 from $440 million in 1982. Report generators are expected to have revenues of $475 million in 1986 from $115 million in 1982. Revenues for graphics packages in 1982 are projected at $560 million in 1986 from $115 million in 1982 (Figure 3).

The report defines system software as products designed to operate the hardware through basic operating systems, to improve the operating capabilities of the hardware systems by routing the flow of data among machine units and to increase the efficiency of systems personnel through system performance measurement tools.

Utility software is divided into two parts by IDC. The first contains programs that perform program design, program support and conversion, job accounting and sort/merge functions. The other part is defined as data management software. In this report, it includes data base management systems, data dictionaries, modeling/analysis tools and word processing packages. IDC also separates graphics packages and report generators (including query languages) from the types of data management software presently available on the market.

Among the trends cited by the report in the systems software area is the movement toward portable operating software in the desktop (micro) marketplace, represented by Digital Research, Inc.'s CP/M and Bell Laboratories' Unix. IDC researchers noted the issue of software portability extends beyond operating systems to languages. They reported that Sof-

(Continued on SR/14)

	1980	%	1981	%	1982	%	1983	%	1984	%	1985	%	1986
STAND-ALONE PACKAGED SOFTWARE BY SOFTWARE TYPE													
HARDWARE MANUFACTURERS													
Systems	$ 895	29%	$1,155	31%	$1,515	33%	$2,010	33%	$2,670	31%	$ 3,505	29%	$ 4,530
Utility	630	28%	805	29%	1,040	32%	1,375	34%	1,845	36%	2,515	37%	3,435
Application	195	21%	235	21%	285	21%	345	22%	420	21%	510	20%	610
SUBTOTAL	1,720	28%	2,195	29%	2,840	31%	3,730	32%	4,935	32%	6,530	31%	8,575
INDEPENDENTS													
Systems	145	35%	195	36%	265	36%	360	32%	475	28%	610	23%	750
Utility	420	44%	605	45%	880	44%	1,265	40%	1,765	35%	2,390	32%	3,160
Application	490	43%	700	44%	1,010	42%	1,435	40%	2,010	37%	2,755	34%	3,690
SUBTOTAL	1,055	42%	1,500	44%	2,155	42%	3,060	39%	4,250	35%	5,755	32%	7,600
STAND-ALONE PACKAGED SOFTWARE BY HARDWARE TYPE													
HARDWARE MANUFACTURERS													
Mainframe	1,315	27%	1,670	29%	2,150	31%	2,805	31%	3,680	30%	4,800	29%	6,190
Minicomputer	125	27%	160	28%	205	29%	265	30%	345	32%	455	32%	600
SBC	235	28%	300	30%	390	33%	520	35%	700	36%	955	36%	1,300
Desktop	45	44%	65	46%	95	47%	140	50%	210	52%	320	52%	485
SUBTOTAL	1,720	28%	2,195	29%	2,840	31%	3,730	32%	4,935	32%	6,530	31%	8,575
INDEPENDENTS													
Mainframe	770	38%	1,060	39%	1,470	37%	2,015	34%	2,690	30%	3,485	26%	4,375
Mini/SBC	225	49%	335	51%	505	49%	750	48%	1,110	44%	1,600	41%	2,250
Desktop	60	75%	105	71%	180	64%	295	53%	450	49%	670	46%	975
SUBTOTAL	1,055	42%	1,500	44%	2,155	42%	3,060	39%	4,250	35%	5,755	32%	7,600
TOTAL STAND-ALONE PACKAGED SOFTWARE	$2,775	33%	$3,695	35%	$4,995	36%	$6,790	35%	$9,185	34%	$12,285	32%	$16,175

Source: IDC

Worldwide Revenues (in Millions of Dollars) of U.S. Stand-Alone Packaged Software Suppliers, 1980-1986

	1980	%	1981	%	1982	%	1983	%	1984	%	1985	%	1986
Operating Systems	$ 17	65%	$ 28	64%	$ 46	59%	$ 73	49%	$109	40%	$153	29%	$198
Compilers/ Assemblers	17	75%	30	67%	50	58%	79	46%	115	37%	158	26%	199
Performance Measurement	22	23%	27	22%	33	21%	40	18%	47	17%	55	16%	64
Communications	31	23%	38	26%	48	29%	62	27%	79	27%	100	26%	126
System Resource Management	58	24%	72	22%	88	21%	106	18%	125	15%	144	13%	163
TOTAL	$145	35%	$195	36%	$268	36%	$360	32%	$475	28%	$610	23%	$750

Source: IDC

Independent System Software Revenue Size (in Millions of Dollars) and Growth, 1980-1986

	1980	%	1981	%	1982	%	1983	%	1984	%	1985	%	1986
Program Support and Security	$ 39	28%	$ 50	26%	$ 63	24%	$ 78	24%	$ 98	23%	$ 120	22%	$ 146
Program Design	50	30%	65	32%	86	35%	116	35%	156	37%	213	42%	302
Conversion Aids	5	20%	6	17%	7	29%	9	33%	12	42%	17	59%	27
Sort/Merge	18	22%	22	23%	27	26%	34	27%	43	26%	54	26%	68
Job Accounting	17	29%	22	23%	27	22%	33	24%	41	24%	51	22%	62
Data Management	205	46%	300	47%	440	41%	620	37%	850	35%	1,150	32%	1,520
Report Generators	48	56%	75	64%	115	61%	185	49%	275	35%	370	28%	475
Graphics	38	71%	65	77%	115	65%	190	53%	290	43%	415	35%	560
TOTAL	$420	44%	$605	45%	$880	44%	$1,265	40%	$1,765	35%	$2,390	32%	$3,160

Source: IDC

Figure 3: Independent Utility Software Revenue Size (in Millions of Dollars) and Growth, 1980-1986

And How Not to 'Purchase Clouds'

How to Get the Most for Your Software Dollars

By Vincent Rauzino
Special to CW‡

The infusion of systems software products has been a mixed blessing for users. Users now enjoy a luxury of choices that was inconceivable just a decade ago, but the costs of luxury are heavy demands on the users' attention to pricing, distribution, support, documentation and maintenance policies, which vary confusingly from vendor to vendor.

In this article, Vincent Rauzino, manager of new product development for Data Decisions, Inc. in Cherry Hill, N.J., attempts to clarify the different types of charges each prospective software package purchaser may be asked to pay throughout the life of a software product.

Several years ago, in a fashionably arty section of Philadelphia, a delightful little shop filled with break-when-you-blow-on-it bric-a-brac displayed a window sign with the words "Vendo Nuves" hand-lettered in scrolling Roman Deco script. Calling up the remnants of my high-school Latin, I translated the sign's words to "I sell clouds."

Although the shop was soon replaced by a more practical women's shoe store, the name "Vendo Nuves" stuck with me. It now comes to mind as a particularly appropriate label for a software company.

Software vendors sell a product that, in exchange for very substantial money, is about as insubstantial as a cloud and about as fragile as that little shop's bric-a-brac. Purchasers are charged for the strictly human intelligence captured in the tapes and disks that is comprehensible to a computer.

A relationship with a software vendor begins with an agreement to purchase, lease or rent a license to use one or more of the vendor's software products; it does not usually end there. Extra charges at the front end of the acquisition are frequently levied for installation and training, and a perpetual charge is generally levied annually for ongoing support or maintenance.

Year	Item	Fee	Cumulatives
1	One-time license right-to-use purchase	$5,000	—
	installation and training; 2 days $da08 $35/hr plus expenses	1,000	6,000
	customer modification	1,500	7,500
2	Maintenance $da08 10%	500	8,000
3	Maintenance $da08 10%	500	8,500
	enhancement charge $da101	200	8,700
	enhancement charge $da102	750	9,450
4	Maintenance $da08 10%	500	9,950
	one-time fee for new version upgrade	1,000	10,950
5	Maintenance $da08 10% of new $6,000 one-time price	600	$11,550

A Hypothetical Worst-Case Example of What a $5,000 Software Purchase Could Cost Over a Five-Year Period

Since a software acquisition is a right-to-use transaction and not a product transaction, the purchaser does not acquire resale rights, nor is the right-to-use freely transferable to another user.

The right-to-use is also not usually transferable within the same purchasing organization. Separate copies of the software may have to be acquired for each system, although discounts are commonly offered for multiple copies at the same site and are occasionally offered for multiple copies to the same company at different sites.

The extra front-end charges vary considerably, but the variation is generally a function of the package price. Expensive packages, such as data base management systems, usually include installation, training and documentation fees within the overall license charge.

Maintenance Fees

The ongoing fee category of maintenance is the most significant auxiliary charge for a software product. It, too, is generally contingent on the size (and thus the package complexity) of the initial, or one-time, cost of the license.

The maintenance fee begins on the first anniversary date of a package's use. Accepted fees average about 10% of the then-current one-time charge for the package. The fees generally are payable in advance and in full on each anniversary date.

The concept of maintenance is a new experience for many software users. Everyone knows and accepts that hardware can break down, but what can break down in software? For one thing, the product may work perfectly well for a standard set of parameters and then fail perplexingly if the parameters form a combination not accounted for by the original designers.

Other even more subtle faults can occur when a program is used heavily in a working (as opposed to developmental) environment. These faults are called "bugs" and invariably require modifications in the product's object code to correct them. Thus the need for software maintenance is just as compelling as the need for hardware maintenance.

Large software companies that sell complex, expensive packages effectively warrant their packages against faults for the first year of the package's installation and then charge for the warranty during all succeeding years through the maintenance fee. However, if the purchaser wants the package modified, a fee — usually a hefty one — will be charged.

Many smaller companies do not provide formal ongoing maintenance arrangements, but they do warrant their products unconditionally (generally for 90 days).

They also provide complete program documentation, which permits the user to modify the program at will after the warranty period. The user then assumes all maintenance responsibilities and surrenders any right of recourse to the original vendor.

The chart on this page illustrates through a short, hypothetical worst-case example how much an on-the-surface $5,000 software purchase could cost over a five-year period.

Some Questions To Ask The Vendors

By Vincent Rauzino
Special to CW‡

The basic control in the software market is simple competition, so the first rule of thumb is to shop around. Then contact the vendors and ask them to respond to the following questions:

- How much does the fully operational product cost?
- What options are offered?, At what prices?, and how are they installed?

Get a clear statement of the options and focus particularly on the cost of desirable options if they are incorporated into the delivered package vs. how much the same options would cost if tacked on after installation.

- Is there a trial period? Some vendors will customarily allow their software to be installed at a prospective purchaser's site for trial use. A nominal preacquisition investment could short-circuit many future problems by helping you to decide on options, training and other costly variables.
- What are the costs for installation assistance and training?
- What are the documentation costs? And how are updates covered? Update costs are usually bundled onto the maintenance fee, although updates can often be purchased separately if the purchaser does not take a maintenance contract.
- What is the cost of a maintenance contract? The fee is generally about 10% of the then-current one-time license fee of the package, beginning

(Continued on SR/6)

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Because Vendor Support Waning

Service Cures Users' System Software Ills

NEW YORK — While DP hardware and software products are increasing in complexity, vendor "hand-holding" support services are becoming a thing of the past as these companies face pressures to lower prices for a rapidly growing user base.

The result for the typical DP installation is a new type of productivity bottleneck — systems software problems — with users forced back onto their own resources to resolve problems of performance and systems interaction.

Frequently, they do not have those resources available. Staff unavailability and budget constraints work against fulfilling the need for highly experienced personnel. Yet experience is what is needed to balance the complex mix of software and hardware systems that make up today's on-line DP facilities.

Productivity Problem

An example of this kind of productivity problem occurred at Concord Fabrics here. Clemont Lee, the new systems manager at the firm, found himself in charge of an IBM 370/125 and 370/138, running DOS/VS and Altergo Products, Inc.'s Shadow II, with noticeable, but undefined, problems at the systems level. Faced with the need for better performance by the computers, Lee called in Rendeck Corp. of Boston.

Rendeck offers a service called Relief that makes use of a group of systems specialists with an average of nine years experience on a wide range of systems. The Relief service begins with one specialist working on-site to resolve immediate system concerns and continues with an "insurance/service/maintenance" contract to handle further needs. The scope of Rendeck's involvement can range from fine-tuning software systems to development, documentation and training.

"Rendeck had our systems stabilized in three or four days," Lee reported. "They also managed to provide some much-needed documentation and enhance systems operations. It was exactly what we needed."

Once the immediate problems had been handled, Concord Fabrics switched over to Relief. "Given the sporadic, rather than continuous, nature of our need for systems programming, Rendeck gave us access to all the resources we needed, when we needed them, at a very reasonable cost. And the degree of expertise is higher than anything we could have justified hiring."

By having systems programming needs handled outside, Lee observed, "We're free to concentrate on applications, knowing the technical support is there when we need it."

How has this arrangement been working out? "Very well," Lee said. "We're able to get high-level experts when we need them. They can usually analyze any problems in a couple of hours and provide solutions. For example, we've been adding a lot of applications to our 370/125, which serves our remote lines to Georgia — so many, in fact, that the system was grinding to a halt. Rendeck came in, made a few changes, and everything's fine again. So our productivity is staying up, while our costs are staying down."

Another Productivity Bottleneck

Another organization that faced a productivity bottleneck because of problems with its system software is the *Toronto Globe & Mail*.

The newspaper uses a pair of IBM-compatible Omega 2s from Control Data Corp. for a number of essential daily chores. These include generation of the mailing labels needed to mail *Globe & Mail* copies and support of the newspaper's advertising billing system. In addition, many new on-line applications, including conversions of existing batch activity, require the CDC machines. The teleprocessing monitor in use at the paper is Altergo Products, Inc.'s Shadow II.

At the height of the problem period, the systems reportedly were going down at least once a day.

"We had a very severe problem," data center manager Bill Sandford explained. "We could not get our systems to work, and we couldn't get any real help from the vendor. It seemed our only alternative was to drop Shadow II and switch to CICS — but we were pretty committed to Shadow II because of its on-line programming capability."

Therefore, Sandford brought in Rendeck's Relief system because he knew this team had substantial experience with both CICS and Shadow II. "They remedied our problem remarkably quickly and left us some documentation as well. Our systems now are pretty reliable — they aren't going down anywhere near as much."

The newspaper followed up this experience with a variety of other requests for assistance. "We needed some help with the on-line system for the order entry, billing and receivables portion of our advertising billing system — putting the program together optimally, making sure it worked and so forth," Sandford explained. "Our own systems people were already full up. So we contracted a programmer for Rendeck. She's been giving us a good deal of direction and helping write the program for us."

Sandford reported several additional ways in which the *Globe & Mail* has been utilizing Rendeck. "We needed an interface between our spooling system and an on-line programming system called Quota, which comes with Shadow II. Rendeck wrote that interface for us, and we're using it. They're also providing a program to create screen formats for us to use in our own programming activity."

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Some Questions for Vendors Before You Buy Software

(Continued from SR/4)

in the second year. But note that fees are being pressured upward toward the 15% level, so try to contract for a fixed rate at the front end of an agreement rather than let the rate float at the vendor's discretion.

- How are enhancements handled? Clarify the difference between a genuine enhancement and a "fix." Enhancements for a fee are optional; fixes are usually free as long as you haven't tampered with the package. Also make sure the full price of your package can be credited against the next major version of the package.

Answers to the preceding questions will provide most average purchasers with at least a rough grip on software acquisition costs.

Other Cost Factors

However, several other factors can influence both the acquisition and the ongoing costs of software. Some selected questions that can be asked to nail down these factors include:

- What discounts apply to multiple acquisitions for installations at the same site or at different sites on the same company?
- Is the source code available? Given the source code and perhaps a couple of other listings, the purchaser knows as much about a package as the vendor. The vendor invariably charges a one-time fee for the code, and the purchaser usually then assumes all maintenance responsibilities.
- What arrangements have been made for ongoing maintenance if the vendor goes out of business? The answers to this question and the next question should be tied back to the availability of the source code.
- What are the charges for custom modifications? Invariably expensive, but possibly beneficial in the long run if the modifications substantially improve the package's utility to the purchaser.
- What penalties can be levied on the vendor for late delivery or nonperformance?
- What notification period is required or what penalty is incurred if a leased or rented package is removed before the contract expires?
- What support guarantees are provided if an older version of the package is retained?

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Editor Offers 'Realistic Assessment' of Unix

The development and workings of Unix — the operating system developed by Bell Laboratories that has sparked much interest and controversy during the past year — is described here by Max A. Lebow, senior associate editor/software at Datapro Research Corp. in Delran, N.J.

By **Max A. Lebow**
Special to CW‡

The scene was a crowded room on the day before the Comdex show late in November 1981. Western Electric Co., the AT&T subsidiary that licenses the rights to use and distribute Bell Laboratories' Unix operating system, announced it had reduced the price of object code versions of Unix to as little as $40 for each copy.

This announcement set in motion a new wave of interest in Unix, which seems to be regarded in some circles as the ultimate new operating system developed especially to get the most out of 16-bit microprocessor-based systems.

Critics of Unix, on the other hand, point to deficiencies in the AT&T-supplied documentation, AT&T's charge of up to $20,000 for a copy of the source code tape and the inconsistencies of the user interface.

A more realistic assessment of Unix seems to be in order. Unix is a multiprogramming, time-sharing operating system developed for use on Digital Equipment Corp. minicomputers at Bell Labs in the late '60s and early '70s.

It was not designed as a proprietary software product, however. Dennis Ritchie, one of its two originators, explained, "It was designed to provide an interesting operating environment for us," meaning the programmers at the Bell Labs research group in Murray Hill, N.J.

Ken Thompson, co-developer of the system, wrote the first code for Unix in an effort to move a program from Bell Labs' General Electric Co. computer to an underutilized DEC PDP-7. Since then, Unix has been developed by AT&T to run on DEC's PDP-11 series and on its VAX computers.

Users communicate with the computer through the Unix "shell" program. This is a command line interpreter that performs some of the same functions as IBM's JCL interpreter. There are three types of files: ordinary, directory and special. Ordinary files consist of text, source code or object code. Directory files link the ordinary files.

Special files, a unique feature of Unix, support and drive I/O devices. A user writes a file to a disk in the same way he would write to a printer.

Hierarchical File System

Like directory files, special files are part of the hierarchical file system. Although they are less accessible than ordinary files, they can be changed by the user without recompiling the whole operating system.

In addition to the operating system per se, Version 7 offers a Programmer's Workbench (PWB) enhancement to Unix. This consists mainly of applications program development tools, including the Source Code Control System (SCCS), which keeps track of changes made by several programmers to a given program. SCCS also allows programmers to reconstruct previous versions of the code.

Late in 1981, AT&T announced Unix System III, which includes Version 7, a PWB and enhancements such as expanded terminal options and accounting facilities for system activity and resources.

An enhancement to remote job entry allows a Unix user to submit to and receive from a remote IBM 360.

• *The Pluses* •

A growing number of people are adopting Unix and cannot say enough good things about it. By December 1981, Unix licensees outside the Bell system numbered 1,440, up from 1,100 in May of that year. Installations were up to 3,229 in December from 2,300 in May.

The advocates point to the uniform I/O and to the file structure as strong support for the "tools" methodology of software development. Unlike "top-down structured" methodology, this approach develops applications by linking combinations of small, well-understood programs called "tools." In the case of Unix, some of the tools are system commands. Because Unix is based on an interactive interpreter, these applications can be developed rather quickly. In one case, a single programmer for a city of nearly a million claims to have rewritten from scratch all the software for his department within two years, using Unix.

Language Support by Unix

Language support by Unix is growing. Compilers and interpreters for Cobol, Basic, Pascal and Fortran that make coherent calls to Unix are on the market. Most of these, with the exception of Fortran, which was offered by AT&T as part of the operating system, are new and relatively untried. One Unix advocate turned the lack of language support to advantage by saying Unix "encourages programming in C and C allows the programmer to write high-level contracts as well as bit-wise and register-oriented instructions."

Hardware support is growing as well. Many of the 40 or more companies producing 16-bit microcomputer systems have implemented Unix; support is on the horizon as well. Amdahl Corp., which has been experimenting with Unix for its IBM 370-compatible computers for more than five years now, sells a package called Universal Time Sharing to anyone who has an AT&T source code license. Western Electric Co. released a C language compiler for the IBM 370 several years ago.

At least three companies are in various stages of developing or offering relational data base systems for Unix. Rhodinus, Inc. has offered a data base system for small and medium-size data bases. Called Mistress, it is being actively marketed by Human Computing Resources Corp. of Canada. Ingres from Relational Technologies, Inc. is being installed in a number of colleges and in at least one production shop. IBM is not yet offering either Unix or a data base to go with it. However, IBM was working on something called System 7 — said to be a relational data base for Unix — in 1979 at the IBM research center at San Jose, Calif.

An important factor driving the Unix bandwagon may have more to do with social factors than with the software itself: namely, the "Unix graduate" phenomenon. Western Electric gave Unix away to many colleges and universities starting in 1975. Graduates of these schools, who started entering the workforce in 1979, were people for whom Unix was "the operating system."

Since 1979, these graduates have been agitating for wider acceptance of Unix. In a sense they will alter Unix to fit their needs and use its built-in adaptability to create a "new" operating system.

The movement toward operating systems that are more like Unix seems to be gathering popularity. AT&T's Bob Guffrey predicted that the activity in new Unix orders would level off three to four months after his November 1981 announcement. As of this writing, however, business is still booming in that small office in Greensboro, N.C. As one busy staffer noted, "if your article generates any more business for us, I don't know if I'll be able to stand it!"

• *The Minuses* •

Unix does have its weaknesses, as even some of its supporters will point out.

Professor of Psychology Dr. Donald Norman of the University of California at San Diego has criticized some capricious abbreviations of commands that occasional newcomers are likely to forget and new users of Unix often find puzzling — peculiar names like "cat" (concatenate) and "grep" (global regular expression print). Some of the other commands criticized by Norman, such as "dsw," have been removed from the system and are also no longer part of the documentation.

Lack of prompts or system acknowledgment that one is in the editing mode is apparently still a problem. Most of the complaints expressed by Norman seem to be of the kind that could have been at least partly overcome by better documentation.

Even creator Dennis Ritchie conceded that comments on the documentation "are common." The original documentation was certainly adequate for the programmers at the Bell Laboratories reseach group. However, once the system was released to outsiders as a product, newcomers left without a system overview and a fuller account of possible uses and misuses of some of the Unix commands.

One explanation for the low marks Unix documentation received in Datapro Research Corp.'s 1981 survey of proprietary software could be the increasing numbers of new users.

People who are not supporters of Unix at all point first to its lack of support for Cobol and other popular applications programming languages. If Unix is implemented on a computer running a large number of Cobol programs, for example, every applications program in the shop will probably have to be rewritten. This has killed a number of implementation efforts in production shops and is only now being addressed seriously by Unix marketers.

In addition, Unix has suffered from the need for a complementary data base management system (DBMS). Although it might be argued that the hierarchical file structure is itself a data management system, this argument is more theoretical than practical. Here, too, the marketplace is having its influence; several companies, including IBM, have been working on a DBMS for Unix.

The claim that Unix is the first machine-independent operating system has been another target for critics. Claims of this kind should almost always be accompanied by the caveat "except for the exceptions." It is likely that without some adaptation to overcome these exceptions, the applications will not run on the new machine. Presently, most of Unix is programmed in the C language, which is elegant but not standardized.

Brian Kernighan, a researcher for Bell Labs, and Ritchie point out in their textbook on C that "Certain parts of C are inherently machine-dependent." The transportability of Unix depends upon whether the implementations of C on the original and target machines work the same way. Put another way, transportability depends upon the uniform implementation of a language where certain parts are inherently machine-dependent.

Critics charge that since so much of the operating system is accessible to the user, the user can change the system to such an extent that it can no longer run software developed for the original Unix. At least one vendor of software for Unix has had some software returned.

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(Continued from SR/2)

ed as it was developed and has performed virtually flawlessly since it went into operation nearly a year ago.

"There is no way we can calculate the size of the savings we achieved by using the automated programming approach because we simply couldn't have done the job any other way," Marc Waldroup, manager of the Thunderbird's data processing division, Crescent Data Systems, explained. "The cost would have been prohibitive [with another system]; it would have taken far too long to do with our small staff, and we wouldn't have the excellent documentation that makes the system both maintainable and upgradable."

The key to this successful effort was Force, an automated programming system developed and marketed by Point Four Data Corp. of Irvine, Calif. Force was designed to free programmers to handle I/O and system interaction and to file data manipulation concerns because it handles tasks such as record layouts, data element descriptions, screen and menu formats, data input and validation.

Force consists of a data base handler, a screen editor, a language processor and a documentation generator. Descriptions of the screen formats, record layouts, data elements and other components are fed into a data base dictionary and executable code is generated.

Book System Developed

The book system developed at the Thunderbird Bookshop operates on a Point Four Corp. Mark 5 computer with 128K bytes of main memory, a Point Four Lotus disk controller and two 130M-byte disk drives, a Point Four Mighty Mux communications multiplexer with 24 ports for the system's 20 CRT terminals and multiple printers and a ½-in. Cipher Data Products, Inc. Microstreamer streaming tape drive for daily use in back up of the disk drives.

The book application software consists of program facilities such as inventory, label file maintenance, purchasing and invoicing. It currently handles more than 37,000 titles in the bookshop stock and cross-references all data for hundreds of publishers.

"The one characteristic that makes a book data system so complex is that virtually no two publishers use the same system for discounts, combinable bindings in the prescribed discount levels and time-related returns policies," Waldroup said. "Consequently, the book system had to find ways to put order into a seemingly hopeless disorder of policies and discounts."

Thunderbird inventory files cross-reference all books in stock by International Standard Book Number (ISBN), despite the possibility of multiple numbers. "If there are two books that have the same vendor, same publisher, same title code and same author, perhaps even the same binding, we can search our files and print all of these out," Waldroup said. "Then we can designate one of the multiple ISBN's as the master record and establish a linkage that places all sales information about that book under one ISBN with a simple reference to the other numbers." Such coordination is carried throughout the Thunderbird system, from receipt of books to sale.

The purchase order facility permits both manual and automatic tasks. Management can scan daily or weekly sales records and make decisions on the reordering of books. For big sellers, automatic reorder points can be optionally set so that a purchase order is generated automatically.

The purchase order system has been designed to make the best use of the multiplicity of vendor discount schedules. "Virtually every book vendor has different discount break levels," Waldroup said.

"We've set up our purchasing facility so that in a single printout we can see all our vendors, all the bindings, how many of them there are, what the dollar value is, what discount break we are at and what the next break level would be," he said. "This gives us just one set of criteria to examine to make the best possible purchase."

Inquiry System

In addition, Thunderbird management has set up a very simple inquiry system that is used daily by clerks on the shop floor.

The Force package's report capability enables reports to be generated on any of the application programs, as well as on sales statistics, Waldroup said. "This allows us to manage all aspects of the bookshop more effectively," he explained.

The Force automated programming package enables users to develop screen menus and layouts that can be stored in the dictionary from which to develop printouts for evaluation and documentation purposes.

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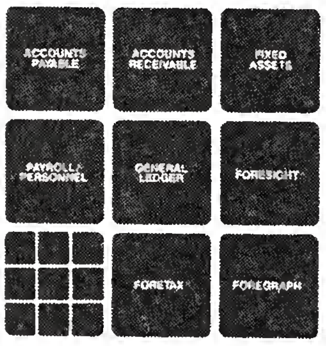

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Bank's Conversion to MVS Supports Two DOS Centers

JACKSON, Miss. — How does a central operating system data center support two remote DOS centers without adding extra hardware or software when the same programs have to run in all three shops?

Deposit Guaranty National Bank, a $1.7 billion bank here, found what it feels is a simple answer to that rather complex question. It decided to convert its Jackson center to OS/MVS and selected University Computing Co.'s UCC Two package to assist the conversion effort by enabling the same DOS program to operate in either a DOS or an OS environment.

The decision to convert to MVS was made for several reasons, Jimmy Pittman, data processing officer and systems programming manager, explained: "We wanted a system that would manage resources and disk space, submit jobs and increase reliability. Additionally, we wanted to make hardware changes without impacting the entire center."

Main Data Center's Capabilities

Deposit Guaranty's main data center in Jackson runs IBM's OS/MVS operating system. It supports two remote IBM DOS centers in other parts of the state. Until 1979, the Jackson center was also DOS-operated. Bank management knew, however, that the center could not remain DOS and effectively utilize its two IBM 3031s. In addition, the DP center's on-line network had grown from 90 terminals and about 45,000 transactions per day in 1978 to 140 terminals and 60,000 transactions daily in 1979. To handle this growth, a more dependable system was needed, along with better resource management, Pittman explained.

Because of the need to have backup for the on-line system, Deposit Guaranty had always been a two-CPU environment, but sharing files between two DOS systems was not supported. Security and data integrity also entered into the decision to switch to OS. Management felt that the MVS safeguards and the availability of security software would make it a better system to protect the data, he said.

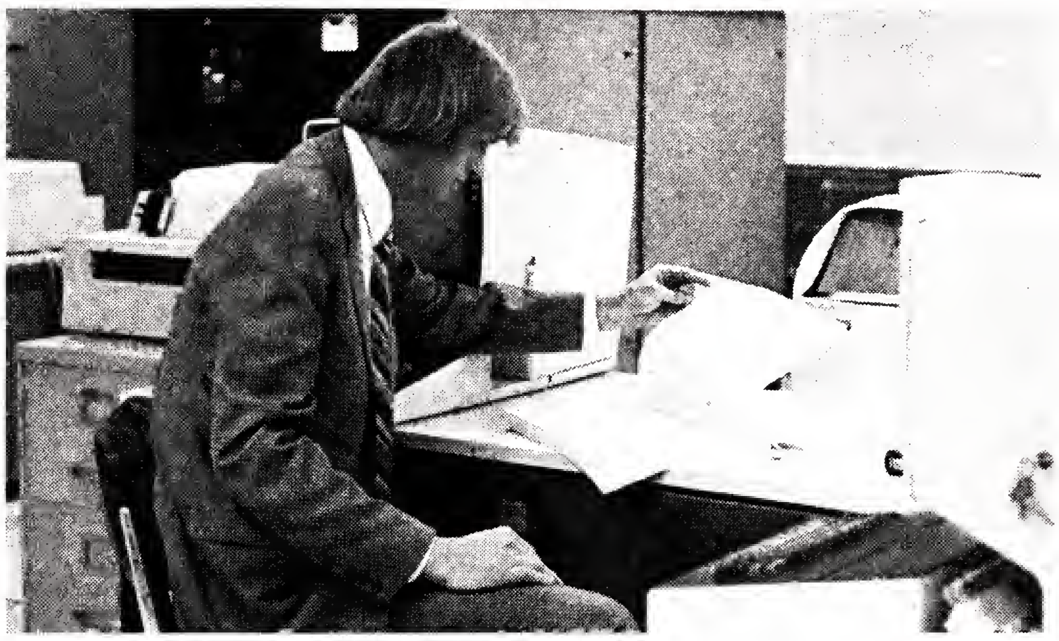
The entire year of 1979 was devoted to studying, researching and planning the conversion. IBM's VM software was selected as the conversion vehicle for its ability to support both DOS and OS operating systems during the conversion period. IBM's TSO and Structured Programming Facility were selected as interactive tools to support the conversion effort. UCC Two was discovered during a company visit to another data center and appeared to be the answer to the question of supporting two DOS centers from an OS center.

"We run the same application programs in Jackson that we do at our remote sites," Pittman said, "but we didn't want to maintain two copies of source code and update each of them every time we had a change. A good transition aid that allows the same programs to run in both a DOS and an OS environment would do that for us."

As the OS conversion began, the applications were broken into four areas: the programs, which were run only in Jackson, were converted to native OS; applications that were vendor packages were simply purchased in the OS version; another category was the programs that would be phased out with OS packages during the conversion; and the fourth category was those programs that were run in all three centers.

These applications were the only ones that were originally planned to

(Continued on SR/14)



Jimmy Pittman, Deposit Guaranty's DP officer and systems programming manager, reviews a program before it is sent to a remote DOS site.

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Users Urged to Agree With Vendor On Issues Before Buying Software

By Thomas R. Mylott III
Special to CW‡

In negotiating a contract for systems software packages, users need to consider several items of unique importance to the acquisition of such software.

Systems software can vary widely in function from an entire operating system to a compiler of a simple programming language for "quick and dirty" programming tasks. These packages tend to have a common trait. They assist in the operation and management of a user's DP department, rather than providing services to the user's non-DP departments.

In addition to the concerns in contracting for any software, vendor and user should identify and agree on solutions for issues that arise in acquiring systems software. The special contract considerations for this software originate in its characteristic of technical complexity and the need many times to establish interfaces with other vendors' software and hardware.

Specifications are important in all software acquisitions. The technical complexity of systems software makes specifying its characteristics even more critical than with application software. After all, there may be generally accepted ideas of what a payroll system should do, but there is no consensus on how an operating system should specifically function. Users should require vendors to describe thoroughly what functions the software will perform. A user takes an expensive gamble in expecting software to have functions not articulated in specifications or in failing to demand specifications as part of the contract.

There are many contract issues involved in acquiring any software, but because systems software plays a special role in the functioning of an installation, it raises some different contractual issues than does application software.

Mylott is an attorney with the law offices of Peter S. Vogel, P.C. in Dallas.

Specifications should also define the hardware and software environments in which the systems software must operate. Some systems software is not compatible with other systems software or with certain hardware.

If the vendor is going to modify the systems software for the user, the contract should provide a mechanism by which the vendor will develop modification specifications for the custom work and the user will have an opportunity to evaluate those specifications before their programming begins. The agreement should also accommodate the programming, demonstration, evaluation and acceptance of the modifications themselves. The cautious user will negotiate to pay as little as possible before accepting the software as modified. If the vendor offers to modify another vendor's package, the user must carefully examine its license agreement with the second vendor. Modification of some software is a violation of its license agreement and almost always voids such vendor's warranty and support obligations. Some systems software packages require changes in user application software or job control. The user needs precise information from the vendor describing what changes in other software installation of the systems software entails and whether or not the changes are mandatory or will merely improve the application's performance. Obtaining a vendor warranty that the specifications describe all required changes to application software gives the vendor responsibility for disclosure of the changes.

The format of the software when delivered is also an important item. A user is better off having the source code. However, most vendors are understandably reluctant to make source code available. Without the source code, the user risks being left without a means of supporting the software if the vendor discontinues support or goes out of business. Source code escrow arrangements are only a limited form of insurance. One way to mitigate the risk is to require a vendor to relinquish a copy of the source code in the event of the vendor's going out of business or discontinuing support. In a crisis situation, however, these contractual provisions may be of limited value. The best form of protection is to be part of a large installed user base that may be able to encourage another firm to continue support.

Another special consideration in negotiating and drafting agreements for systems software is that systems software must often have an interface to a multivendor hardware and software environment. For example, the user may have an IBM operating system with another vendor's disk space management system and IBM plug-compatible disk drives.

When something goes wrong in any multivendor situation, all fingers point in a circle. The user often ends up as a referee. As far as is possible, the user needs to place the burden of resolving problems in a multivendor environment on the vendors. For instance, if a user is purchasing plug-compatible disk drives around the time it intends to install a disk space management system, there is the possibility of having the two vendors working together.

Contract Issues Threefold

Acquisition of systems software presents contract issues that differ from those involved in procuring application software. The contract issues involved are threefold:

- First, the user needs a vendor promise to upgrade that vendor's software to be compatible with hardware and software changes at the user's installation.
- The second issue is whether this vendor service is free or for some additional charge.
- Third, should the vendor require the user to upgrade or lose vendor support? One approach is for the user to have a maintenance agreement with the vendor which includes the vendor's maintaining the compatibility of its software with upgrades and new releases of the hardware and software in the user's installation.

The vendor's responsibility for providing this compatibility should have reasonable limitations. For example, obligating a vendor to make modifications to accommodate a CPU that is not plug-compatible with the prior CPU is generally unreasonable. When vendors market their software, they often make claims and representations about its performance. Some of the claims are vague ("Our package is the best sort/merge there is"); more specific representations may relate to capacity, speed or some other characteristic. If a vendor's claim induces a user to acquire that vendor's product, it must be incorporated in the final contract or it is an empty promise.

Sometimes the use of a systems package requires a user to convert applications software, files or job control to a form compatible with the new package. The responsibility for doing the conversion, for meeting the schedule and for success of the conversion are questions that need answering in the contract.

As in the acquisition of application software, a contract for systems software must clearly delineate the process for user evaluation of the software and what constitutes a user's acceptance of a particular package. A good approach is to structure the process in logical steps. First is the vendor's installation and demonstration of the software on the user's system. Next, the user can evaluate the software within some specified period and indicate in writing acceptance or the reasons for rejection. Of course, part of this evaluation period could be devoted to parallel testing. If the user rejects the software, it is reasonable to give the vendor an opportunity to attempt correction of any deficiencies.

Moreover, a contract provision to deal with situations in which the user will not accept the software can furnish both parties with a way of painlessly terminating the agreement and avoiding a lawsuit.

The user's ability to maintain systems software is critical. Unless the user gets source code, the vendor will be the only maintenance resource available.

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Data Center Tracks Software Use With Utility

SACRAMENTO, Calif. — The hardware, software and programmers needed to provide data processing for 96 California state agencies are located at the Stephen P. Teale Data Center here. The problem this agency has faced is its inability to track the use of its software resources.

"There were no control factors assessing the use of the packages," John Tierney, associate software specialist, explained. "When renewal time came for those on lease, there was no reliable way to confirm which packages should be dropped and which were used often enough to merit renewal." He is responsible for installing, testing, debugging and maintaining many of the center's proprietary software packages.

"Each agency is given a good deal of autonomy," Tierney said. "They manage their data in their own ways and use the software that suits their methods. The Teale Data Center selects and purchases the proprietary software packages the users need."

A Laborious Task

The only tracking information that was available resided in the IBM System Management Facility (SMF) in data generated by the operating system of the mainframe. "This data is difficult to access and not printable in its recorded form," Tierney said. Its records run 32K bits in length, far larger than anything that can be used in report form. Accessing this data via a Cobol program is possible, but it is a laborious task, Tierney explained.

One of the software packages brought into the center some years back was DYL-260 from Dylakor, Inc. In July 1981, Dylakor introduced DYL-280, a free-form, English language report writer/utility. The new package was brought into Teale by one of the agencies for its use.

Though Tierney did some work with DYL-260, the fixed-form report writer, it was the free-form package that caught his imagination. Very quickly he could see that it would be useful for some of his own tasks in addition to those requested by the agency involved.

Two Tasks Performed Well

According to Tierney, two tasks that DYL-280 performs very well are extracting and reformatting of data. He reasoned that if the package performs these functions with various files successfully, why not try it with the SMF data.

He knew that DYL-280 can easily pick out the necessary information from the 32K-bit record — which agency, package used, time involved — and interpret it. He also knew that SMF data often requires analysis at the bit level — something DYL-280 can easily do and that cannot be done by Cobol or other similar report writer/utility packages.

He put DYL-280 to work with the SMF data and in minutes had a report with the information he needed. Once the report was complete, Tierney felt that a graphics display of the information would show package use even more effectively.

The output from the DYL-280 report was reformatted (using DYL-280) and written to a file that could be processed by a graphics package from SAS Institute, Inc. Again in minutes, the report was complete, but this time, in vivid graphics display.

Much of Tierney's time is spent with the data processing housekeeping tasks — the utility functions. Since data comes into Teale from so many agencies and since they operate so autonomously, data arrives in all forms of file organization, record format and data types and resides on all forms of memory devices.

In a recent project he developed some test data. The program required a 1,200-byte record. One option open to him was to use TSO Edit, IBM's time-sharing option, to key in the test data, but the maximum record size allowable was just 255 bytes.

He solved the problem by using DYL-280 to create the required 1,200-character record. He used DYL-280 to create a small prototype file in card image format (80 bytes). He defined fields within the 80-byte records and then moved them to corresponding fields within a 1,200-byte record format. The output from the DYL-280 run became the test data file he required.

"The whole process of reformatting the file from the beginning to end with DYL-280 required just five minutes," he said. Now that the task is complete, when new test conditions are required, he makes the changes to the prototype file and submits the

(Continued on SR/16)

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MVS Conversion Supports Remote DOS Centers

(Continued from SR/11)

run under UCC Two. After the first programs were converted and running in Jackson, all the source code was moved and then the DOS Cobol compiler began running under UCC Two. This move allowed Deposit Guaranty to run the same object code under OS that was being sent to the DOS remote sites. It enabled the bank to use all the OS facilities in Jackson and still maintain the DOS remote centers.

"Using UCC Two was easier than we expected," Pittman said, "although there were some things the package could not handle, such as our reader/sorter. It's a time-dependent device, so we had to convert the programs for it to native OS."

In 1980 the conversion took place, with some 950 programs being converted on schedule both to native OS and to UCC Two. There were some programs remaining in 1981, and Pittman decided to run these under UCC Two instead of converting them to OS, because he found that the UCC Two route was much quicker.

With the conversion complete, Deposit Guaranty began realizing a dramatic increase in throughput through the data center, according to Pittman.

On most of the applications converted, the bank realized at least a 25% runtime reduction on each one. Using some of the OS facilities and taking out all the operator responses that were in the DOS programs also played a big part in decreasing runtimes.

By 1981 the bank's on-line network had grown to more than 400 terminals and was averaging 120,000 transactions per day. Uptime on the greatly expanded network has averaged 99% since the conversion — something that could never have been achieved under DOS.

Additional benefits have come in the form of disk space reductions, he continued. Many of the applications were written for older disk devices. The UCC Two reblock facility allows the data center to use newer, more efficient disk devices with larger track capabilities. This change can be done strictly through the JCL without programming modifications.

"For instance," Pittman noted, "we had a demand deposit application that ran 3½ hours. By using the reblock facility, that 3½ job was cut to 2½ hours — a 33% reduction."

One concern Pittman and his management shared in using the transition system was overhead. Converting an application that was running under UCC Two to native MVS, they discovered they could not find any difference at all in the runtimes between UCC Two and MVS, Pittman recalled.

Looking back over the entire conversion project, he said, "The best thing we did was to spend almost an entire year in the planning stage."

Software Sales To Rise: Report

(Continued from SR/3)

tech Microsystem's UCSD p-System, with over 30,000 users, is one of the fastest growing microprocessor software development systems. "Applications using this system can be moved from one machine to another without the need for modification. Basically the machine translates the language in which the program is written into the machine-unique code."

Overall, the packaged software market is expected to experience healthy growth through 1986 at 34% compounded annually, according to IDC. Revenues for independent suppliers will outpace those of hardware manufacturers seven percentage points at 38% and 31% compounded annually respectively, the surveyers reported.

The largest growth in software, according to machine type, will occur in the desktop (microcomputer) area, which IDC predicted will have a 54% growth rate.

The researchers noted that software publishers have been included in the report listings for the first time because "most of the major ones are assuming more control over the production of the software they publish, and therefore of the maintenance and support functions, and no longer consider themselves 'just publishers,' but software houses as well." Minicomputer and small business computer software is projected at 39%. Mainframe software will have the slowest growth, at 31% compounded annually.

The Packaged Software Statistical Reference Book included analysis of 138 independent software companies (up from 88 last year) and 18 major hardware vendors.

The report is available for $3,500 from IDC at Five Speen St., Framingham, Mass. 01701.

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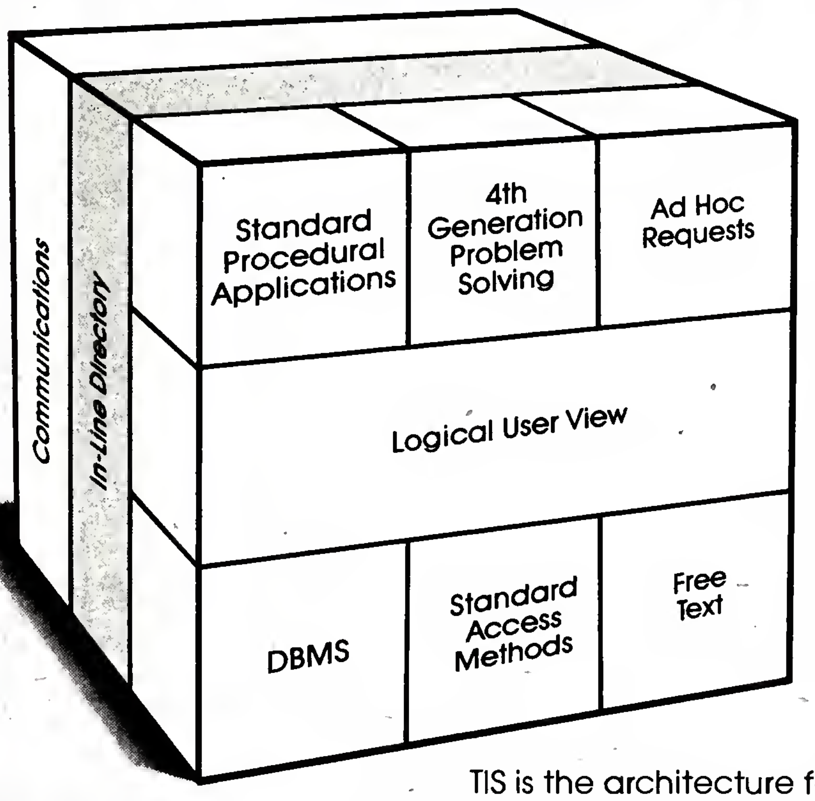

TIS Logical User View—Insulation from Change

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Users Warned Data Dictionary Alone Cannot

By Howard Baker
Special to CW‡

Several years ago the Smothers Brothers recorded a humorous little ditty:

"I see by your outfit that you are a cowboy.

"I see by your outfit that you're a cowboy, too.

"We see by our outfits that we are both cowboys.

"If you get an outfit, you can be a cowboy too."

Let's substitute a few words and create a few poetic platitudes of our own. For example, "I see by your data base management system that you are a data base administrator. If I buy a DBMS, I will be a data base administrator, too."

Or how about "I see by your DP auditor that you have good internal control. If I hire a DP auditor, I will have good internal control, too."

I think you see my point.

Today we live in a complex world in which a large number of people want to believe that what is complex really is not. How many dollars have been spent in the past 10 years on underutilized or unused software such as DBMS or even data dictionaries? How many companies have been sold on the concept of data resource management and bought a dictionary to achieve it?

However, things never seem to work as easily in your own DP shop as they appear in those nice color slides during the vendor's presentation. Buying a data dictionary will not buy you data resource management, well-designed and structured systems or documentation. It also will not buy change control. Change control problems require a systems approach for their solution. All too often we buy the software (the easy part) and neglect some or all of the other components.

Managing Change

In order to manage change properly, several steps *must* be taken:

- Identify what entity sets need change management.
- Determine and document existing change procedures and conditions.
- Define standards and procedures for accomplishing change for each critical entity set.

State Tracks SoftwareUse

(Continued from SR/13)

DYL-280 test generator program to create the 1,200-byte format.

The hardware used at Teale meets the center's huge demands. All told there are 12 computers — two Amdahl Corp. systems (a 470V/8 and a 470V/5), two IBM 370/168s, one IBM 3033 and seven IBM 4300s for distributed data processing.

Tierney sees his role at Teale as that of consultant in many ways. It is his job to see that the agencies receive the service they need from their proprietary software packages. He and his group do the installation, the troubleshooting and handle the problems when they arise.

Because the agencies are so diverse, many kinds of proprietary software packages are in use. Tierney views himself as something of a proprietary software package specialist. He is familiar with many packages. Among these are most of the well-known packages.

Generally, he does not push one software package over another, but Tierney said he finds himself recommending DYL-280 to agencies that do not yet use it. "It is so flexible, so useful and handles both utility and report writing so well that I find myself encouraging others to use it," he said.

The future bodes well for DYL-280 at Teale. "Its use will most certainly grow here," Tierney said.

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Buy Resource Management, Change Control

- Delegate, within the organization, specific responsibilities for accomplishing specific changes.
- Establish methods of reporting and correcting weaknesses or errors.
- Delegate, to an independent organizational unit, specific responsibilities for reviewing and monitoring change.
- Finally, establish methods of reporting and correcting weaknesses or errors.

Our concern over change control is centered around one key issue — how does a given change affect the security, privacy, auditability, accessibility or integrity of our data? Because all the other components within the DP environment are subservient to data, managing data means managing change.

Now how can we best manage this complex environment with scores of entity sets and literally thousands or tens of thousands of actual individual entities? Modeling this complex environment is one approach. We can then inspect the model instead of the real-world entities to evaluate the impact of change. I'm beginning to sound like a vendor, right?

No, I am going to tell you right here that what I just described in a few sentences is an extremely difficult, time-consuming and very expensive task. However, there are some areas where modeling, at a certain level of detail, is practical.

Ask Certain Question

Before deciding to model the entire data processing world, you must ask certain questions: How often does the real-world entity that you are inspecting change? How difficult is it to inspect the real-world entity directly?

Understanding the answers to these and other questions will help determine what should be modeled and what should not.

To safeguard data, effective internal control techniques are needed. The four essential elements of a change control system are authorization, implementation, documentation and verification.

While much attention has been directed toward the integration of data dictionaries with DBMS and report writers, let me suggest that the most critical integration from a control standpoint is with systems design, project management, work authorization, documentation and library change management systems. The dictionary should be the focal point.

I would like to describe what I consider to be some essential elements of such an integrated system by using MSP, Inc.'s Datamanager as an example.

The project management system module provides a central control of all authorizations. Its data base would provide detailed information on all work planned, in progress, on hold, removed after being authorized or completed. The data dictionary would be the central control file for entity validation.

I also suggest that the data dictionary be considered as the documentation data base and that it be used in conjunction with a communicating word processor. The documentation would reside on the data dictionary where it could be retrieved via a word processor. I believe an integrated documentation system using a data dictionary linked to a communicating word processing system provides the basis for the documentation system of the '80s.

Remember, buying a cowboy outfit doesn't make you a cowboy.

Baker is a full-time lecturer in the Systems Analysis Department of the University of Texas at Arlington and a part-time consultant with the southwestern office of Q.E.D. Information Sciences, Inc.

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Report Gives Guidelines Toward Defining a DDS

**By Charles Seagren
and Jerry Everett**
Special to CW‡

Without proper handling, a data dictionary system (DDS) can readily become a bottleneck that is of little or no use to anyone.

With this dilemma in mind, the data dictionary special interest group (DDSIG) of the Association of Intel Corp. System 2000 Users for Technical Exchange drafted a report entitled "Toward a Definition of 'Data Dictionary.'"

The group attempted to isolate certain principles or guidelines that a DDS should follow. Its goal was to maximize its usefulness and correctness while minimizing the risk of failure.

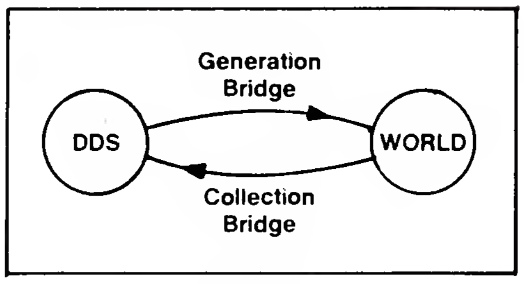

Figure 1

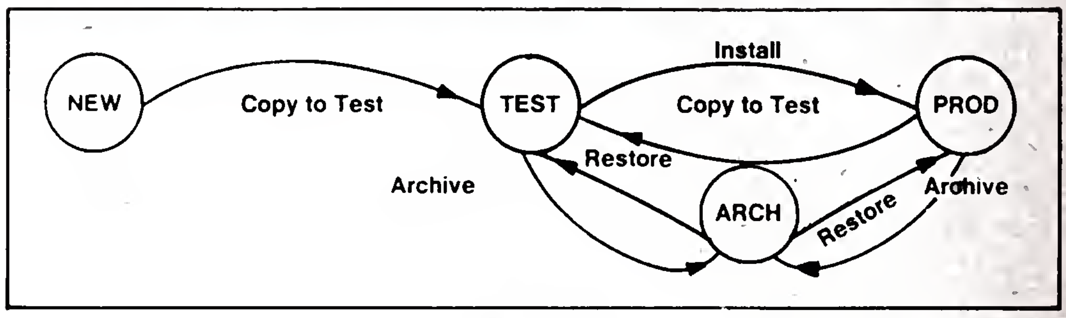

Figure 2

While these guidelines are necessarily general, they should help in the evaluation, development and/or enhancement of a DDS:

- A DDS must be able to inventory data regardless of its storage medium. In particular, it must be able to document data bases, conventional computer files and information that is not stored in any computer.
- A dictionary must be cost-effective: system development must be as fast or faster with a DDS than without it.
- A DDS must be active, so that its contents can be reasonably affirmed to be correct.
- It must require minimal training.
- It must be self-documenting.
- The logical view of the DDS must be independent of its implementation.
- A DDS must have adequate control, security and auditability features.
- It must be extensible, that is, the user must be able to create new entities, attributes and relationships.
- The user should be able to select the features desired with minimal effort, for example, via parameters.
- A DDS must support recursive relationships among entities.
- It must support system development throughout its entire cycle, from requirements definition through operating and maintenance.

Minimal Requirements

In the light of these guidelines, the DDSIG attempted to identify its minimal requirements in terms of interfaces, outputs, maintenance, control, security and auditability.

- *Interfaces.* It is critical that the DDS actively interact with its environment, so as to ensure the accuracy of its contents.
- *Outputs.* DDSIG identified the following on-line inquiry needs: (Figure 1).

This information must also be available in batch reports that are flexible in terms of format and selection criteria. Finally, some form of audit report (who updates and when?) should be supported.

- *Maintenance.* An authorized user should be able to update the DDS via both batch and on-line methods. In all cases, the update facility must have a semantic knowledge of the DDS so updates can be immediately validated — the user should not enter more than is absolutely necessary so users can be easily trained.
- *Controls.* The lifetime of each entity is controlled by a status indicator that specifically limits use of the entity by the DDS.

The allowable status indicators are:

NEW — Anything added to the data dictionary for the first time, incomplete, unusable for any process but LIST, CHANGE or DELETE.

TEST — Complete and formally approved for nonproduction use, can be further modified without formal approval. An organization may optionally, through a parameter, specify that multiple TEST versions are allowed. Otherwise, only one TEST version is permitted.

PRODUCTION — Complete, tested and formally accepted for end-user operations. There is at most one

(Continued on SR/20)

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Tracks Base Register Values

Disassembler Eases Source Code Reconstruction

By Fred Schuff
Special to CW‡

One of the more tedious and unsupported tasks is that of reconstructing source code from program modules.

Whether the need arises from simply losing source code or from the desire to investigate code that was supplied by the manufacturer or a vendor, the interrogation of load modules (executable modules) is difficult and time consuming. Some basic tools are available to assist in this task, but they often leave much of the work undone and they do not provide for the total reconstruction of source code.

The motivation to design and build a disassembler comes from having to perform the disassembly task many times. In most cases only portions of code were examined, but total code reconstruction was necessary quite a number of times. By repeating the process, the time involved decreased due to the learning curve effect but was still significant.

Even so, errors were introduced because of the large amount of data generated in the process. There had to be a better, faster and less expensive method for the process.

The ideal disassembler would start with the data available, a load module (Figure 1) and produce the original source program code or some close but equivalent code. One concession usually made is that the generated source code is assembler language.

Therefore, the available data is a load module that contains an image of the code in machine instruction format with additional control information from the translator and the Linkage Editing process. The Linkage Editor Program combines machine code and control information about each program in the executable load module into a library member that can be loaded and executed.

Design Objectives

From this starting point, a set of design objectives were established (Figure 2).

Sourcer is the resultant product that was developed for internal use by Martin Marietta Data Systems, Inc. It attempts to generate code that is executable when reassembled. The code is also modifiable due to the establishment of base registers and the creation of labels in place of BDDD operands.

The ability to determine which registers are base registers and the contents of those registers is especially critical to creation of labels that can be referenced throughout the code. Labels are defined at relative locations within the program. These locations must be able to be represented in BDDD format as operands in referencing instructions. (Note: the BDDD address format represents the address of an instruction or data constant calculated from the contents of a base register (B) and the value of the displacement (DDD), where DDD is three hexadecimal digits with a base-10 value from 0 to 4,095.

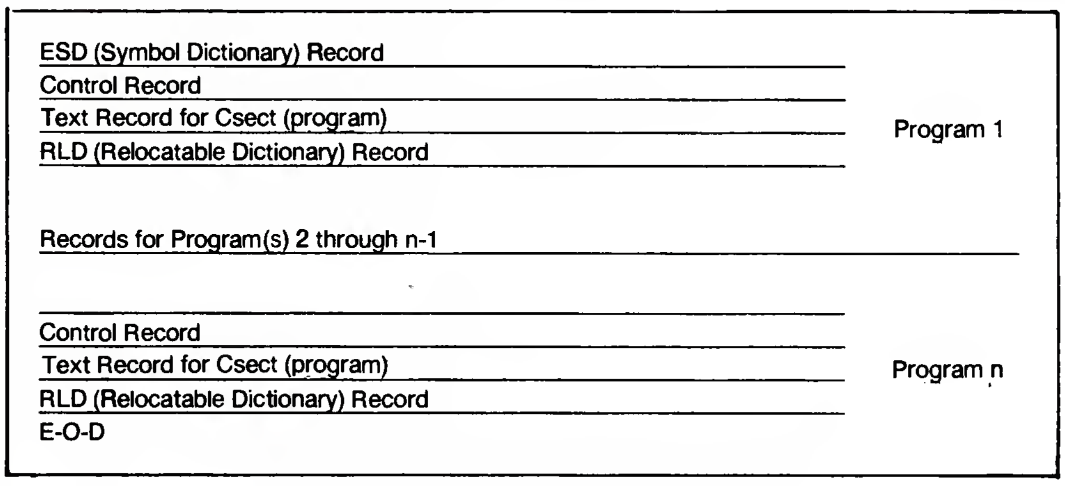
ESD (Symbol Dictionary) Record
Control Record
Text Record for Csect (program)
RLD (Relocatable Dictionary) Record
Program 1
Records for Program(s) 2 through n-1
Control Record
Text Record for Csect (program)
RLD (Relocatable Dictionary) Record
E-O-D
Program n

Figure 1: Load Module Record Format

The determination and base register values is not fool proof. The assumption around which the algorithm is designed is that some normal statement sequence is followed in the code. When multiple base registers are defined in the code, Sourcer attempts to duplicate this multiple definition. Where base register values are loaded or computed, Sourcer will attempt the same value loading or computation by following the instruction sequence.

Instruction Sequences

There is a set of normal instruction sequences that Sourcer will recognize in the attempt to define/compute base register values. Normal statement sequence implies some standard conventions such as the sequence of statements for the program "Sample" (Figure 3).

The procedural requirements for Sourcer are listed in Figure 4.

The use of two passes through the module allows the first pass to determine where labels are required and the second to generate the code using these labels. Pass-I adds internally generated labels to the Symbol Table and enables backward references to labels.

Stepping through the module (instructions and data constants) is in 2-byte increments. Data constants are normally treated as two bytes in length while instructions are two, four or six bytes depending upon the particular instruction generated (Figure 5).

```
SAMPLE CSECT
       STM      R14,R12,12(R13)         Save Registers
       LR       R12,R15                 Load Base Register
       USING    SAMPLE,R12              Tell Assembler
       LR       R11,R13                 Save A (Old Save Area)
       LA       R13,SAVE AREA           Get A (New Save Area)
       ST       R11,4(R13)              Chain the Save Areas
       ST       R13,8(R11)                via Normal Convention
       •
       •
```

Figure 3: Sequence of Statements for Program 'Sample'

To provide for cases that were not handled automatically by Sourcer, special control commands were provided for the user. Options provided the ability to set base register values in the code (or reset them at various points in the code) as well as to force data constants at various locations.

One of the biggest problems encountered in code reconstruction is the determination of whether a location contains an instruction or a data constant. To help, the Privileged and/or Floating-Point instructions are treated as data unless specified as instructions to Sourcer via control records or parameters specified at execution time.

An additional option allowed the specification of segments of a module to be treated as data, whether the data appeared to be an instruction or data constant. By default, Sourcer will generate instructions for any data encountered if a valid instruction is possible, unless explicitly instructed to generate a data constant.

The Non-Relocating Loader was developed to read modules from LOAD Libraries into a storage area. The control information is read and saved for use in stepping through the code.

In addition to assembler language, Sourcer has been used to disassemble programs written in Cobol, Fortran and PL/I. In some cases, it is necessary to disassemble the code and examine the generated code and simulated assembler listing. If the generated code is not as desired or the format is incorrect, the process can be altered by using special control records in a subsequent execution. Where the code can not be disassembled satisfactorily due to problems of base register determination or multiple base register resettng, Sourcer can be told to ignore base register code.

1. Determine and assign base registers automatically.
2. Generate source code with statement/data labels rather than base-displacement operands.
3. Generate address constants (A-cons, V-cons, Q-cons).
4. Generate instructions and data in the proper form (whenever possible) and distinguish between the two.
5. Disassemble all programs (Csects) or selected programs (Csects) from a given load module.
6. Use register notation (Rx) for base/index registers.
7. Provide informational comments to make the code as understandable as possible.

Figure 2: Design Objectives

Sourcer was developed to process code for IBM OS/VS/MVS systems, but is easily adaptable for DOS/VS modules.

Schuff is a consultant in the marketing services division of Martin Marietta Data Systems in Orlando, Fla., where Sourcer was developed for internal use by the company.

1. Use a two-pass process to generate base registers and labels.
2. Create an instruction table with characteristics data about each instruction.
3. Build a module loader to read load modules to retrieve control information and then create an in-core image of the module.
4. Generate a symbol table created from load module control information and internally generated symbols.
5. Provide a user request table for specification of information to assist in the disassembly process.

Figure 4: Procedural Requirements for Sourcer

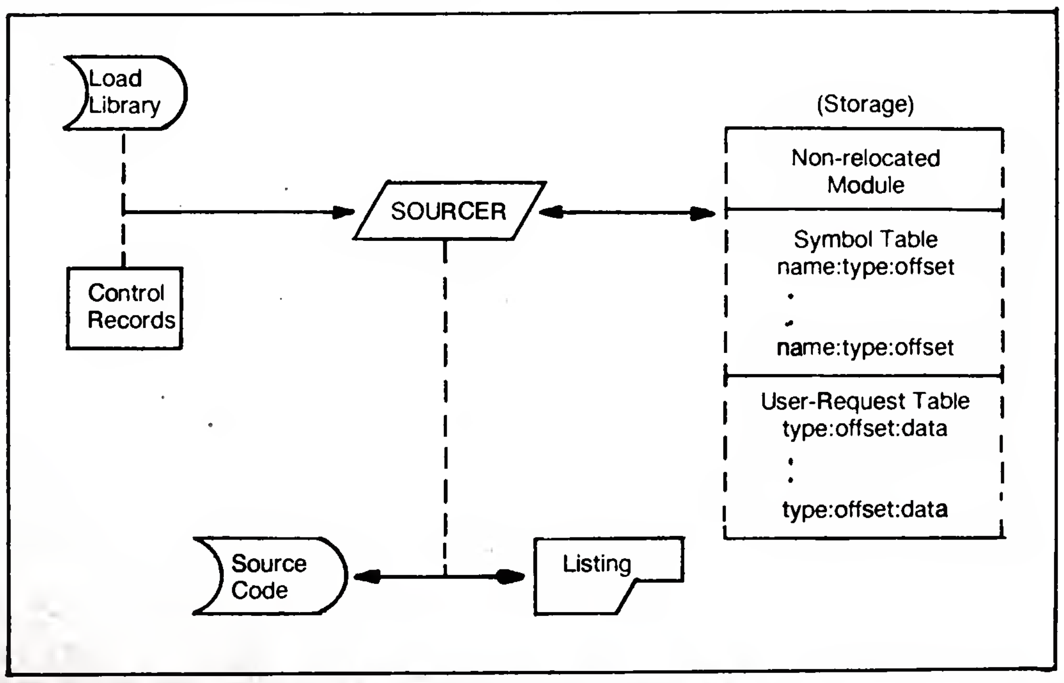

Figure 5: Sourcer Processing

Report Gives DDS Guides

(Continued from SR/18)

PRODUCTION version of an entity.

ARCHIVE — No longer used for testing or production and formally approved for retention. Multiple ARCHIVE versions are supported via a level number.

Changes in status on the DDS are preceded by formal written approval. The DDS logs all status changes. These changes may later be displayed in an audit report.

When the DDS collects a series of entities for a defined operation, the operation precedent permits entities to be mixed with others of equal or higher levels. An entity cannot reference another with a status below its own. The order of status precedence is:

- Level 1 — PRODUCTION.
- Level 2 — TEST.
- Level 3 — NEW, ARCHIVE.

The state graph for status indicators (Figure 2) can be summarized as:

- *Auditability*. The primary data dictionary audit tool is the request log. For each status change, the request log contains who made the request (user ID); what was requested; date the request was made; response to the request (done, on hold, rejected); response date; and level number of entity.

Until a response is made, the entity is locked so that further modifications cannot occur.

Four Considerations

There are four considerations for securing the data definition against either damage or sabotage:

- Basic read/write protection via user passwords.
- Limited encryption/decryption of sensitive areas of the data dictionary.
- Levels of password authority for status changes and limited access to nonsensitive data dictionary items.
- Phantom entities that appear only for certain levels of password authority or encryption.

We have attempted to define some of the principles and requirements of a minimal DDS. As the title makes clear, we have a long way to go before a DDS is well-defined.

Seagren recently formed Minimax Systems in Flossmoor, Ill. Everett is with the Michigan Wisconsin Pipeline Co.

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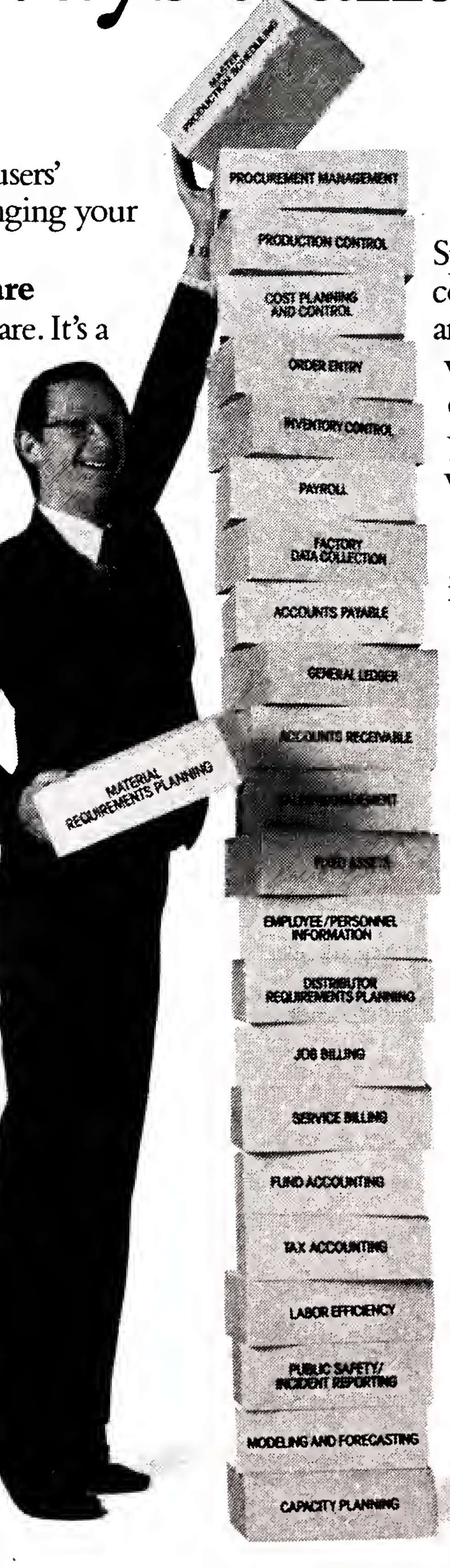

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Makes Believers Out of Users

Monitor Aids DP Training in Engineering Firm

HOUSTON — Convincing programmers and operations people to try new software packages may be one of the most overlooked problems in the data processing field today.

Often these people prefer to make do with "home grown" products rather than adapt to or even investigate a new software product.

Brown and Root, an international construction and engineering company here, has discovered a way to counteract this problem and, at the same time, work on increasing its data processing department's effectiveness.

Tim Sisk, supervisor of computer hardware at Brown and Root, explained that the company is using Candle Corp.'s Omegamon, a software monitoring system. Brown and Root has instituted a training program using a wide-screen projection system that is tied to an IBM color CRT terminal. The color highlighting helps to reinforce certain error messages that the operations people might be seeing. In addition, the utilization of color helps to get the class members interested in the product by drawing attention to the highlighted error messages that the operator needs to look for. Then the operators are taken through some of the commands and the different functions that Omegamon can perform.

Problems Spotted

As a result, the people who went through the training program have started using Omegamon more effectively. According to Sisk, "Before the users call us to say they have a problem, many of the operators have already gone through certain commands and found the problem."

Sisk continued, "The general reaction is that the operators like Omegamon a lot, because it tells them more on a systemwide basis what is going on. If there are no exception displays and the Omegamon screen is not producing the error messages they have been trained to look for, then they know that everything is running alright. They like the flexibility Omegamon provides. They know that they can be reassured by looking at the screen and know that everything is OK."

Brown and Root is currently running IBM's MVS 3.8. Its hardware configuration consists of Amdahl Corp. V/8 and V/6 systems; IBM 3168 Attached Processors; approximately 108 spindles of storage devices; 24 tape drives; two Comten, Inc. communications devices; two IBM 3705s; and several printers. In addition, the company is running IBM's IMS, TSO and Vtam and has written an on-line access system.

There was a time before Omegamon when problems were not evident, Sisk recalled. There were reserved lockouts, missing tape mounts and jobs in loops, to name a few problems. In addition, the operators would lose track of swaps and have to wait to find out which jobs were waiting on which data sets. Omegamon has helped solve these problems, he said.

For example, the data processing center can now tell how long a tape mount has been waiting. By using the XQCB display, the operators can now tell when there is a reserve, which system it is coming from and who has it, he noted. If there is a swap outstanding, the operators can determine it by the enqueue name. "As far as job looping is concerned, they can tell which job is using up excessive amounts of CPU. Moreover, Omegamon can indicate the loss of page data sets, memory, CPU or other critical resources. In short, it provides the majority of the information necessary for problem determination."

Greatest Advantage

Perhaps the greatest advantage of Omegamon for Brown and Root is its multiplicity of usage, according to Sisk. The hardware group uses it for problem determination, the operators use it to monitor the system and enqueue complex waiting for data sets and the systems programming staff use Omegamon for monitoring the performance of the system.

All of this can be accomplished because Omegamon indicates where there might be problems, he continued. Its exception analysis capability permits looking at the system, especially particular tasks, and indicates which tasks are locked out, which device address is causing the problem and how much time (in real time) the tasks are delayed. In addition, there is a device plot that permits a graphics display of I/Os as they pass through a device. Other features include a bottleneck warning and an ability to give the status of executing jobs.

Sisk believes that productivity is up on a per-job basis through the use of Omegamon because the jobs are no longer failing on tape mounts or on enqueue lockouts. Prior to Brown and Root's installation of Omegamon, there were 10 to 20 jobs on tape mounts within a 24-hour period. Since Omegamon, there are no more problems of that nature. As a result, productivity has increased.

Tim Sisk, supervisor of computer hardware at Brown and Root, uses a color CRT terminal to explain the use of the software monitor.

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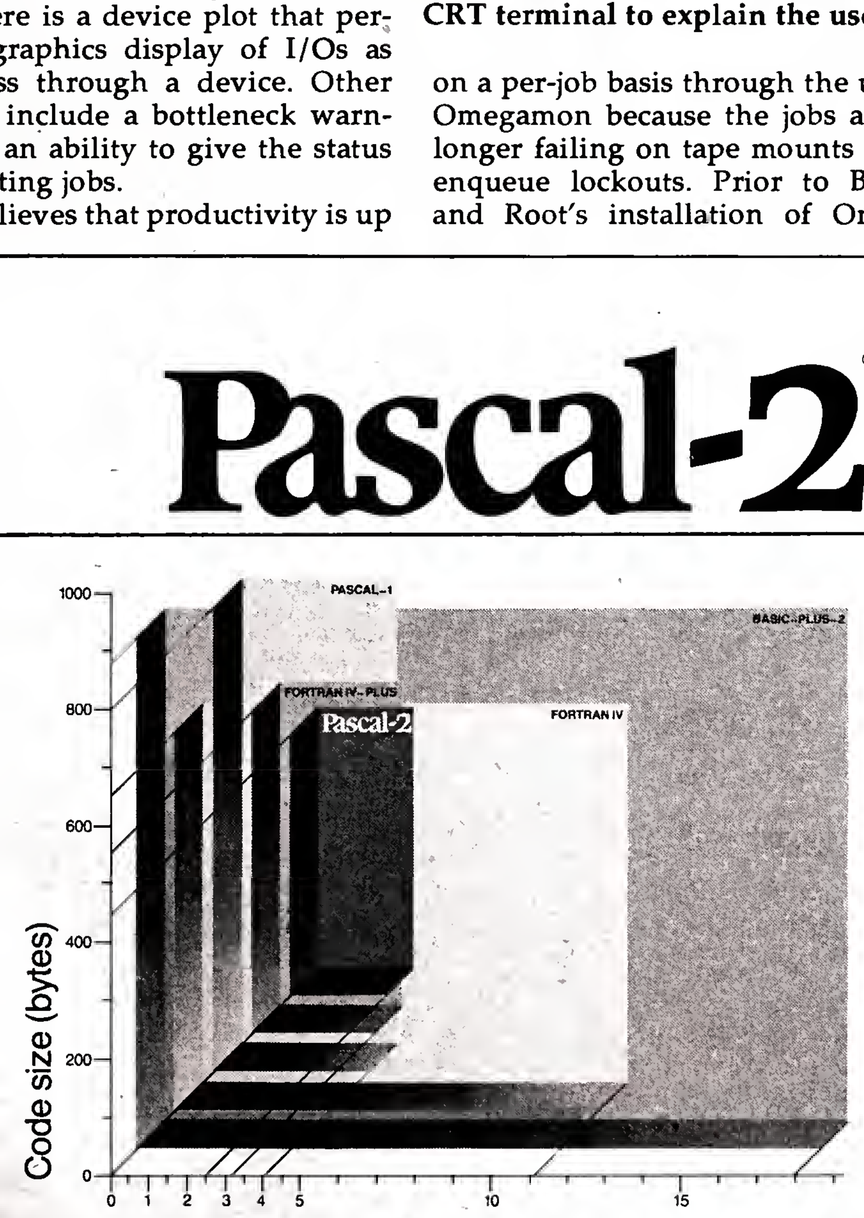

Quicksort benchmark executed on a PDP-11/45.

The Pascal-2 system consists of an optimizing compiler, a high-level debugger and other utilities.

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Program Generator Spurs Jump From IBM CPU

TEMPE, Ariz. — A software development tool influenced the J.S. Redpath Corp. here to change its computer environment from IBM to Prime Computer, Inc. equipment.

This $50 million corporation, a contractor for underground mining and engineering, employs approximately 600 people at three locations: British Columbia, Ontario and Arizona. It also offers consulting, design and construction of shafts and exploratory drilling.

Gary Goodenow, administrative services manager for the U.S. office, said this conversion from IBM to Prime equipment came so that the company could take advantage of the increase in productivity offered by Escape, a program generator from Software Management Systems (SMS) that runs on the Prime Information System.

He explained how the decision to make a change was made. J.S. Redpath was using an IBM System/34 that was not meeting expectations. Because the company had recently experienced tremendous growth, a larger computer seemed to be the answer, and an IBM 4341 was ordered. Goodenow also began looking for economical, available software.

During the search, he found some promising applications, but they were oriented to Prime systems. Looking further into the Prime environment, he discovered Escape, which immediately attracted his attention.

He commented: "At Redpath we are faced with a typical data processing problem — a lot to do with a limited staff. We were looking for productivity tools, and that's what initially made us look at Escape."

After a demonstration showed just how fast Escape creates programs, Goodenow was sold. "I've been in data processing 15 years," he asserted, "and Escape is the greatest thing I've seen."

Escape is a program generator that uses "English-like" sentences to reduce the time and effort required for the development of a business information system. Changes or enhancements can be made by merely modifying these "English-like" sentences. Documentation is created automatically as quickly as the system is developed. When any change is made, the documentation is automatically updated immediately.

The phenomenal speed with which Escape creates programs drastically reduces the time required to write a system. Software Management Systems has conducted comparison tests in which programmers using Escape were able to produce a program 40 times faster than with traditional methods. The time that would have been required to prepare documentation is not even included in that calculation.

Gordon P. Perkins, president of Software Management Systems, declared, "Escape will be instrumental in solving the growing shortage in programmers. This program and other similar ones now being developed will enable programmers to work at what we now consider to be incredibly fast speeds."

Although Goodenow was sold on Escape, he had to convince his five-member staff, all trained on IBM equipment and hired especially to work in what was expected to be an IBM shop. After seeing Escape and realizing the potential for gains in productivity, the consensus of the staff was to convert to Prime gear in order to use the generator.

Next Hurdle

Goodenow's next hurdle was convincing the company's top management to make the change. After the shock of his recommendation to take such a radical step had a chance to settle, a half-day presentation convinced management that with initial expenses being more or less equal, Escape would enable the Prime system to provide long-term savings.

In this instance Goodenow felt fortunate to have a management that he characterized as demanding in their expectations. He was able to show them how Escape would enable the DP staff to respond quickly, accurately and economically to their requests. The change was approved on the basis of Escape's potential for providing productivity advantages, and the IBM 4341 was cancelled.

Following the installation of the Prime Information I-5000 (currently I-750) last fall, the programming staff attended a one-week training program at Software Management System's offices in Englewood, Colo. Its computer-aided support courses accompany the program to provide on-site user training. Goodenow noted that SMS has continued to maintain close contact and offer good support.

"The programmers like Escape," declared Goodenow, "They have been busy in other areas and are just beginning to see how much it can do. They are now seeing how it maximizes programming tasks."

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For On-Line Applications

Convenience Stores Sold on Productivity Aid

TULSA, Okla. — Frustrated by the lack of progress with development of on-line applications, a chain of convenience stores here turned to a software productivity aid.

Quiktrip is a chain of some 240 convenience stores. The company went on-line eight months ago, with an IBM 4331 Group II running DOS/VSE and CICS and faced several alternatives for developing on-line applications. The DP staff could either write code in command-level CICS or search for an interactive way to streamline the programmer-CICS interface.

Quiktrip had an experienced CICS command-level programmer on staff and assigned him to develop four on-line applications. Meanwhile, technical support specialist Chris Park installed screen generator software and tested it by coding an on-line leasing system. However, the writing of user exits for every panel in the system added significant time to that required to get the system up and running. Even more cumbersome was the compile and link to CICS for every program change he made to the leasing system. And each time, CICS had to be shut down.

Park then began to investigate other on-line programming solutions and attended a User Files On-Line (UFO) demonstration at the Phillips Petroleum Co. in Bartlesville, Okla. The demonstration and his other research, prompted Park to recommend that Quiktrip install UFO from Oxford Software Corp. of Hasbrouck Heights, N.J.

Quick Installation

UFO was installed at Quiktrip in 20 minutes, including CICS shutdown time. "I was able to turn UFO over to the programming staff the very next day, and they were using it to create screens even before they attended the UFO training session," Park said. Programmer Bill Vierira produced more than 15 screens during the first week he used UFO.

Vierira used UFO to develop Phase I of the stores project, a data entry system for tabulations of the daily operation and store sales. The next two phases of this project also will use UFO. Phase II will read the weekly data into the batch processing system, and Phase III will directly input the data into files witout batch processing. Initially only the Tulsa headquarters used Phase I of the store system, but within a few months, the Wichita, Kan., division office installed a synchronous data link control (SDLC) line as well. This upgrade allows the Kansas division to use UFO-generated screens to input data directly into the Tulsa computer and balance that data on-line before final reports are run.

The weekly report entered by each division office is hundreds of pages of data. Before UFO was available, corporate keypunch operators had only three days to enter this data on diskettes. Today, with division personnel entering data into the computer using UFO, Park reported that keypunch has both the time to enter other information and catch up on their backlog.

"In the six months that UFO has been installed, I think it has paid for itself in decreasing the time needed for screen generation," Park said. "I've found that I can develop a three-or four-screen program, plus menu, and generate a report in about 30 minutes with UFO. It only takes about five mintues to display a file. In one week, using UFO, I brought up the entire leasing system and rebuilt the 25 existing screens. By eliminating many duplicate screens required for the display function in the previous system, I also decreased the number of screens in the current system to only 10. During that week, I also wrote one user exit for a square-foot calculation that runs in 30 seconds' and I added security codes into the leasing system."

Park designed the leasing system for the accounting department, which uses UFO commands to browse, display, add, update and delete information pertaining to leasing agreements held by Quiktrip. The UFO program also provides for a ones-page report to be printed "As soon as the users initiate the UFO print function, the report prints out instantly. It happens so fast that it looks as if the printer made the request for a report," Park said.

Because UFO is a menu-assisted system, accounting personnel have easily learned to use the system, Park added. "Some of the accounting clerks now working with the store and leasing system had never seen a CRT. Still, it only took us two days to

(Continued on SR/24)

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Fiberglass Maker Sets Up Eight Systems in Two Years With Data Dictionary's Aid

MINNEAPOLIS — When Proform, Inc., a manufacturer of fiberglass design and manufacture, began evaluating computer systems three years ago its data processing department was just starting to evolve.

The company was planning to acquire a computer and develop a full-time but minimum-size staff. Data at the time was processed manually or through service bureaus.

One of the first things Proform's then-three-person management information systems (MIS) department did was analyze the flow of information within the company's manual systems. The intent was to automate critical systems, starting with manufacturing and variance reporting in each plant and later incorporate financial reporting.

To provide the best service to users with a minimum amount of resources, Proform carefully planned its purchase of hardware and software tools. The software had to be integrated and require a minimum effort to maintain and tune.

"By using IBM hardware and the latest integrated software packages from Applied Data Research, Inc. [ADR], our eight-person DP staff has been extraordinarily efficient and productive," said Dave Swenson, Proform's MIS director. "We set up eight systems in two years, which says a lot for how easy the software is to use. ADR's support staff and software helped us tremendously."

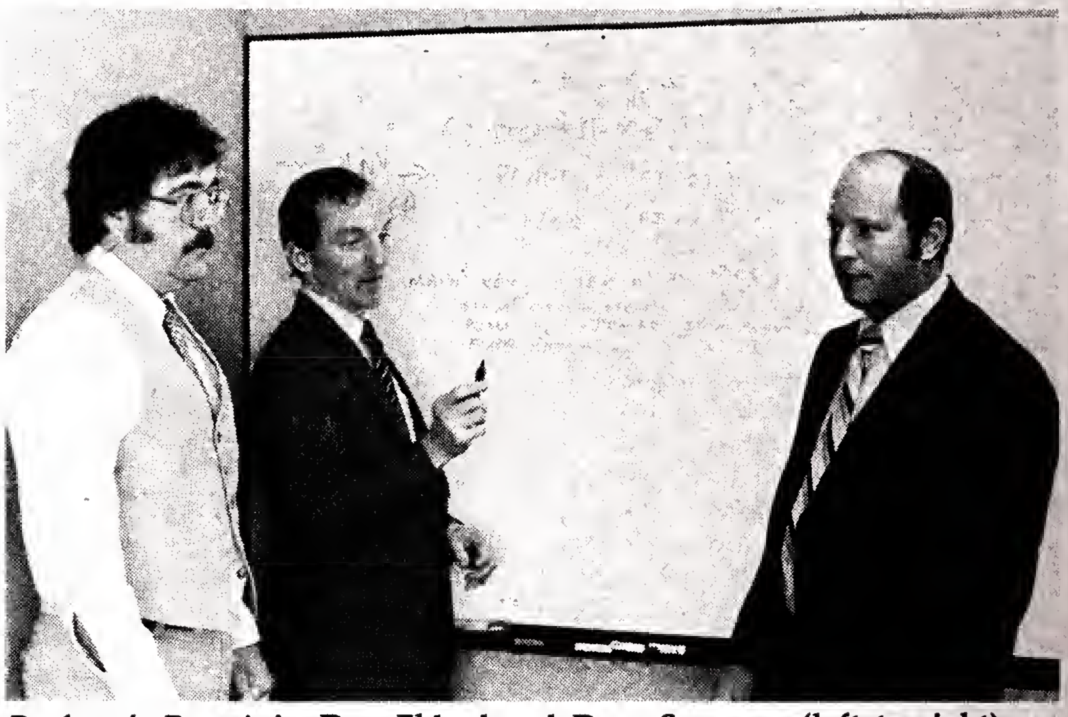
Plans were to acquire ADR's Datadictionary sometime after the original purchases. Proform was aware of literature in the trade press and vendor claims that a data dictionary would become the central piece of software in progressive shops. In actual practice, this has proved to be true in some unexpected areas, especially documentation.

Proform's goal was to document once, in one place, and to make maintenance simple and convenient. The Datadictionary automated the documentation process and, in some cases, eliminated the need for documentation entirely. Said Don Eldred, systems and programming manager, "Our data base reports from the Datadictionary are our documentation, and they're more complete, accurate and up-to-date than they've ever been. By describing the characteristics of the ADR/Datacom data base to Datadictionary, most of the documentation is done."

In addition, textual descriptions can easily be added to the Datadictionary. For example, while recently creating its calendar data base file, Proform added a few paragraphs of comments and ran the dictionary reports, and the documentation was complete.

Through an integrated interface to the data base control systems, Datadictionary eliminates all definition and change utilities. "We no longer need to maintain base, file, record, key and element generations," said Ron Aris, manager of operations and technical support. "Only the name of the data base is required for one Datadictionary generation utility."

According to Aris, information from Datadictionary about the data base is then fed to the data base system. If the data base is new, it is created, if old, it is changed. If changes are demanded, the data base is rebuilt and an impact report is issued.



Proform's Ron Aris, Don Eldred and Dave Swenson (left to right) run through a problem.

Recently, a new key was required for an existing data base file. New key information was first added to the Datadictionary. Datadictionary then drove the data base generation process and created a new data base. Explained Eldred, "The impact report told us to unload and reload the existing file in order to establish the new key. After that, documentation was produced and the process was finished. We had a new key for an existing data base. The entire process took only a few hours."

In the future, Proform plans to move all field definitions from ADR's Librarian to the Datadictionary. Field and file definitions will be drawn directly into the Cobol source during compilation. This will allow maintenance of definitions under a "do it once" principle with no additional effort on Proform's part. According to Swenson, this should promote improved documentation while eliminating the need for copy books.

As Proform adds system documentation, distribution reports and relationships (such as job-program and program-job), the Datadictionary is proving to be a control and documentation tool far beyond the company's expectations. "Datadictionary allows us to maintain control with a minimum of effort," Eldred said.

Stores Sold on Software Aid

(Continued from SR/23)

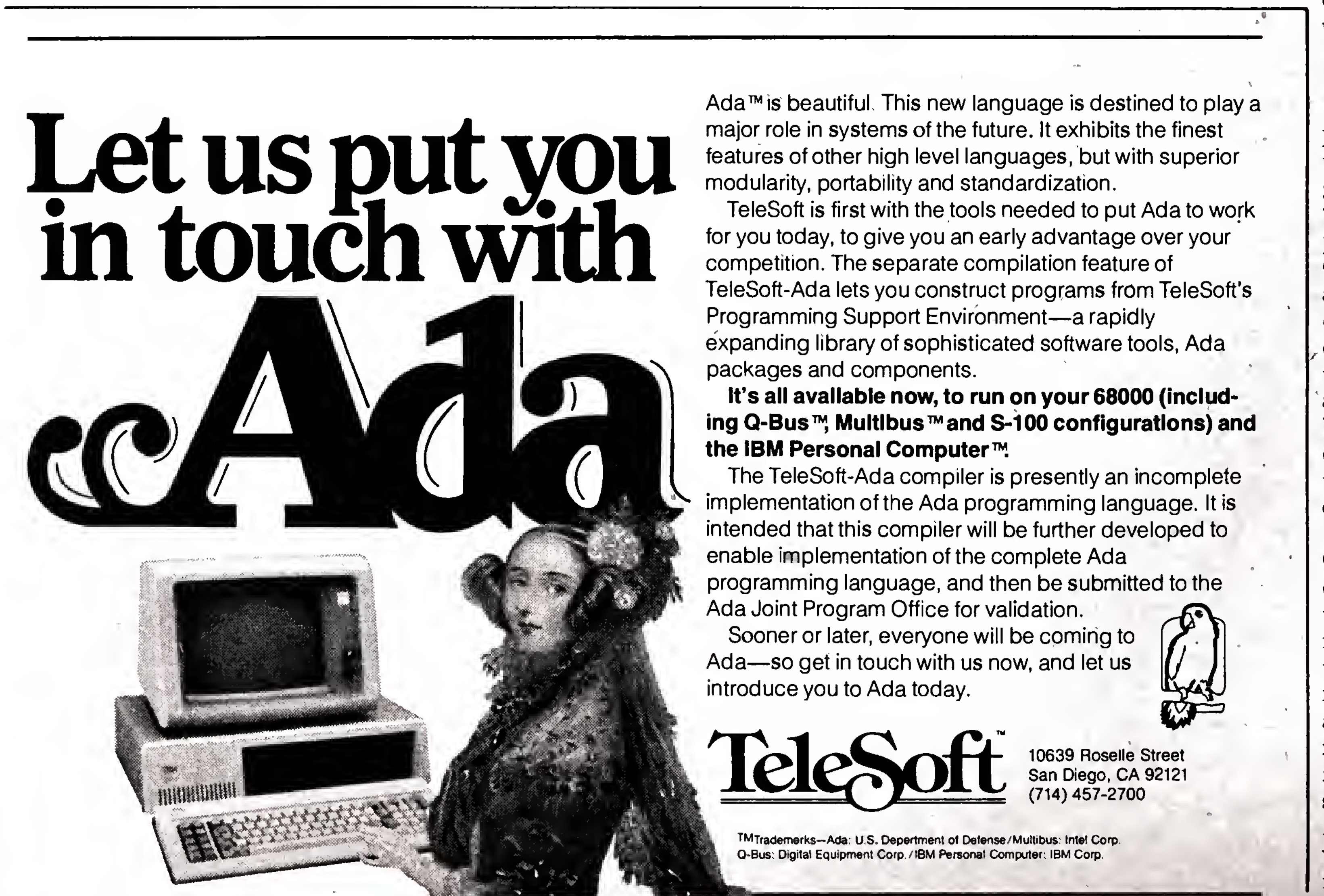
train them to access information with UFO," he said.

Park described another instance where production time has dropped to seconds because a UFO program makes the Vsam files more efficient. "I wrote a display and calculation that tabulates the amount of disk space required by an initial data entry and how much that entry is expected to grow. If I had to calculate this figure by hand, it would take about 30 pages of work, but with UFO it takes only 10 seconds to receive the figure on-line. UFO can calculate within 10% to 15% of actual usage the number of I/Os to be used.

No Formatting

"I like having the ability to design a program, put it on the screen and test it immediately without having to generate CICS tables," Park said. "My programmers find that UFO displays information quickly on the CRT, and they don't have to worry about formatting. Program logic required by CICS screens is of no concern because UFO does the logic for them. Also, programmers don't need a book in front of them to code in UFO. They may use the pocket reference guide, but only for the few times they create attributes or edit codes."

Most upcoming applications at Quiktrip will utilize UFO as a data entry tool. Park reported plans to enter time card data into batch processing in the same way, and concluded that "Quiktrip also plans on networking next month. Using UFO as a data entry tool, we will build an information data base. And with Oxford's support, which ranks with some of the best we've ever received from systems software producers, we will continue expanding the on-line inquiry systems."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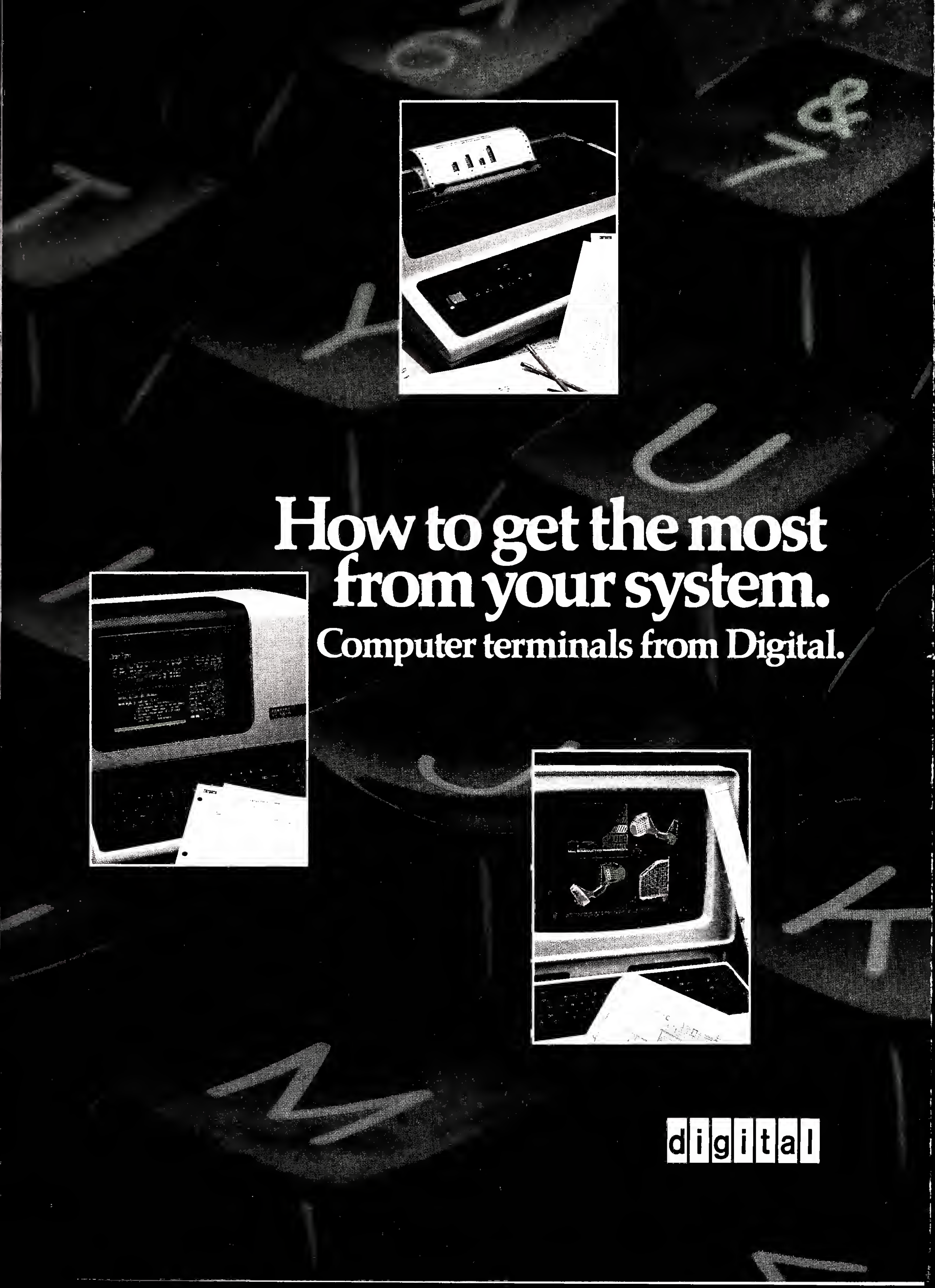
How to get the most from your system.
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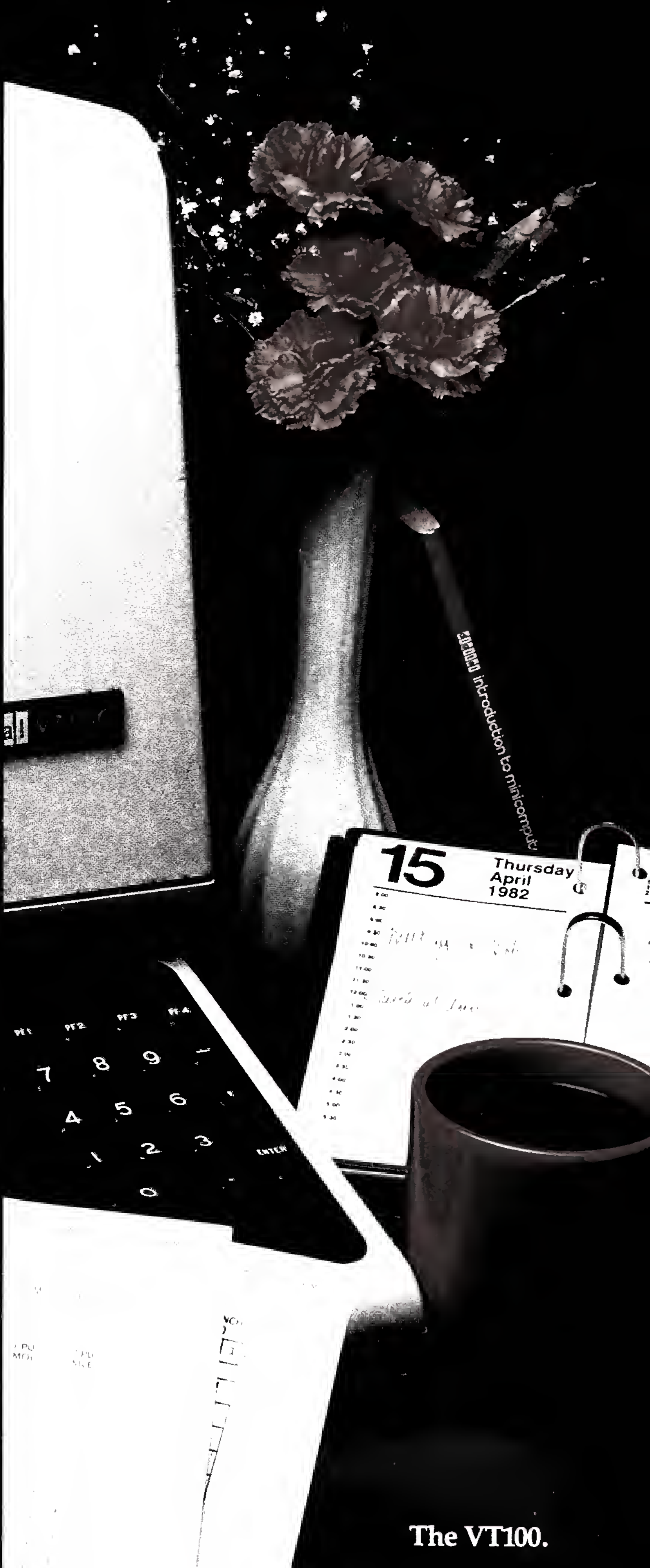
When you're making a capital investment of any size, there's only one smart strategy to take. A long term strategy. Instead of just fulfilling today's needs, you've got to look down the road. Will you need more terminals later? Will your applications change? If so, will the terminals you buy today adapt to them? How about reprogramming? Retraining? And service?

At Digital, we give as much thought to these issues as you do. And our products prove it. For instance, our word processing terminals can function efficiently within a network. Our graphics terminals can even be used to access data bases. And virtually any terminal we make will talk with any computer we make.

Perhaps it's this compatibility and flexibility that have helped make our VT100 and DECwriter terminals industry standards. After all, we pioneered the interactive computer, which created the demand for terminals in the first place.

It only makes sense that we're the leader in their design and development.



The VT100.

Less than a year after its introduction in 1978, the ASCII asynchronous VT100 had already firmly established itself as the industry standard. And for good reason: it provides an impressive list of standard features that are usually considered extra cost options on other terminals. Features like a double width/double height character mode for increased legibility. Normal and reverse video. 80- or 132-character line widths. Bi-directional smooth scrolling and split screen capability. Non-volatile set-up memory. And communications speeds up to 19,200 baud.

An EIA RS-232 interface is also standard with the VT100 family, but you can add a 20 mA interface if you like. You can also specify our Advanced Video option for 3 added capabilities. First, you get a combination of 24 display lines and 132 columns. You also get space and connections for an extra character set which resides internally. And perhaps most important, you get the ability to display any character in any combination of blinking, underlined, bold, or reverse video.

And since additional space and power are built in, you can choose from a variety of upgrades and configurations that let you build a VT100 to your own specifications.

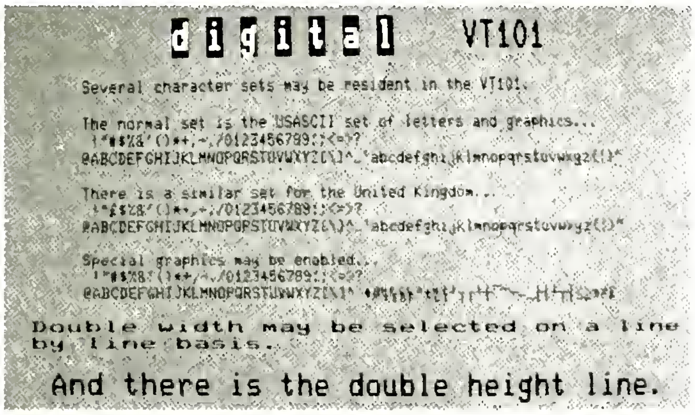
THE VT101, VT102 AND VT131. TERMINALS DESIGNED FOR ECONOMY.

If you don't see a time in the future when you'll need all the expansion capabilities of the VT100, our economical VT101 can give you substantial savings, particularly in quantity. With no space required for add-ons, all controlling electronics can be mounted on a single board. That gives the VT101 the highest reliability and lowest monthly maintenance charge of any terminal we make.

For communications not only with our own systems, but also with systems from other vendors, you'll need our VT102 or VT131. The VT102 includes our Advanced Video option and printer port, and gives you half- and full-duplex modes, as well as controls for a wide variety of U.S. and European modems. For word processing applications, it is also available as the VT102W.

The VT131 is made for use with asynchronous ASCII systems, and gives you everything you get from the VT102 plus local editing and block mode transmission.

So no matter what system you have, you've got a choice in the VT100 family.



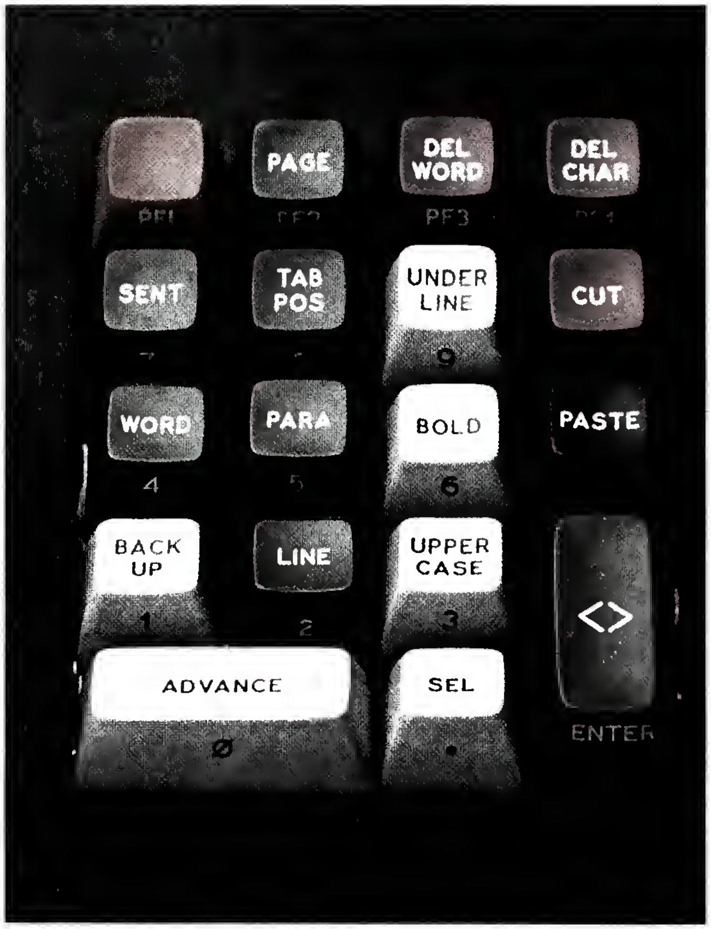
```
         d i g i t a l     VT101

    Several character sets may be resident in the VT101.

    The normal set is the USASCII set of letters and graphics...
     !"#$%&'()*+,-./0123456789:;<=>?
    @ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~

    There is a similar set for the United Kingdom...
     !"£$%&'()*+,-./0123456789:;<=>?
    @ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~

    Special graphics may be enabled...
     !"#$%&'()*+,-./0123456789:;<=>?
    @ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^ ◆▒␉␌␍␊°±␤␋┘┐┌└┼⎺⎻─⎼⎽├┤┴┬│≤≥π≠£·

Double width may be selected on a line
by line basis.

 And there is the double height line.
```

VT100s FOR WORD PROCESSING. AND FOR HIGH VOLUME TEXT EDITING.

With word processing becoming increasingly popular, Digital has made simple upgrade kits available for the VT100 and our VT125 graphics terminal. These packages include our Advanced Video option and a word processing keyboard. When used with software like our DECword, DECword/DP, DECtype or WPS, you can use them to perform powerful word processing and editing functions.

For high volume text editing, your choice is clear. The VT173 is perfect for anything from documentation to newspaper make-up. In addition to standard word processing functions, the VT173 can use our DECset text management system for real high performance editing. That means you can compile text from every terminal in your system—no matter what system you own—and combine it into final galley form complete with justification and markup.

No matter how simple or complicated your text processing needs are, there's a terminal in the family that's ideal.



RT100, RT102 AND RT137 FOR TOUGH ENVIRONMENTS.

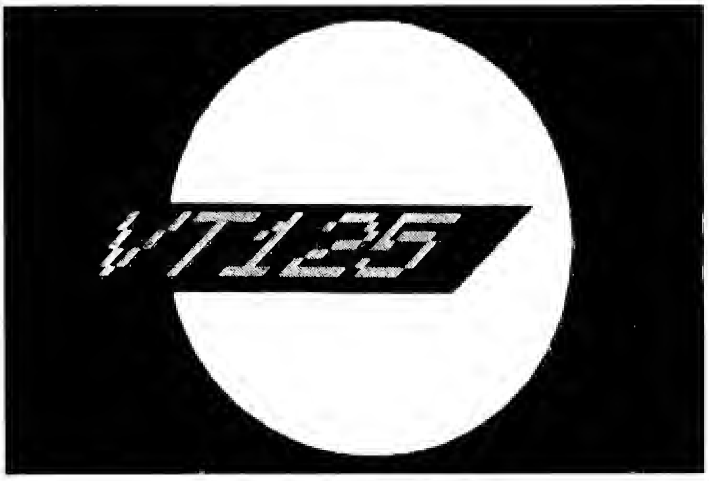
If you need a terminal that can stand up to the most adverse conditions—a factory floor or warehouse, for instance—Digital offers you a choice of three VT100-based terminals in ruggedized versions. The RT100 with all the standard VT100 features, the RT102 with advanced video, printer port and communications, and the RT137 with a light pen for bar code data collection.

All three are protected by sturdy sheet steel cases and heavy-duty filtration systems. For added flexibility, all three versions include a hinged keyboard that allows you to shelf-mount the terminal conveniently at eye level.

When you need high functionality in a difficult environment, our ruggedized terminals are up to the job.

THE VT125 GRAPHICS KIT.

In the event you might need graphics capabilities down the road, the VT100 won't hold you back. Our VT125 graphics kit is nothing more than a single board that gives you all the features of your VT125 graphics terminal. (If you want to know more about the VT125, turn to the graphics section of this guide.)



YOUR VT100 CAN EVEN BECOME A PERSONAL COMPUTER.

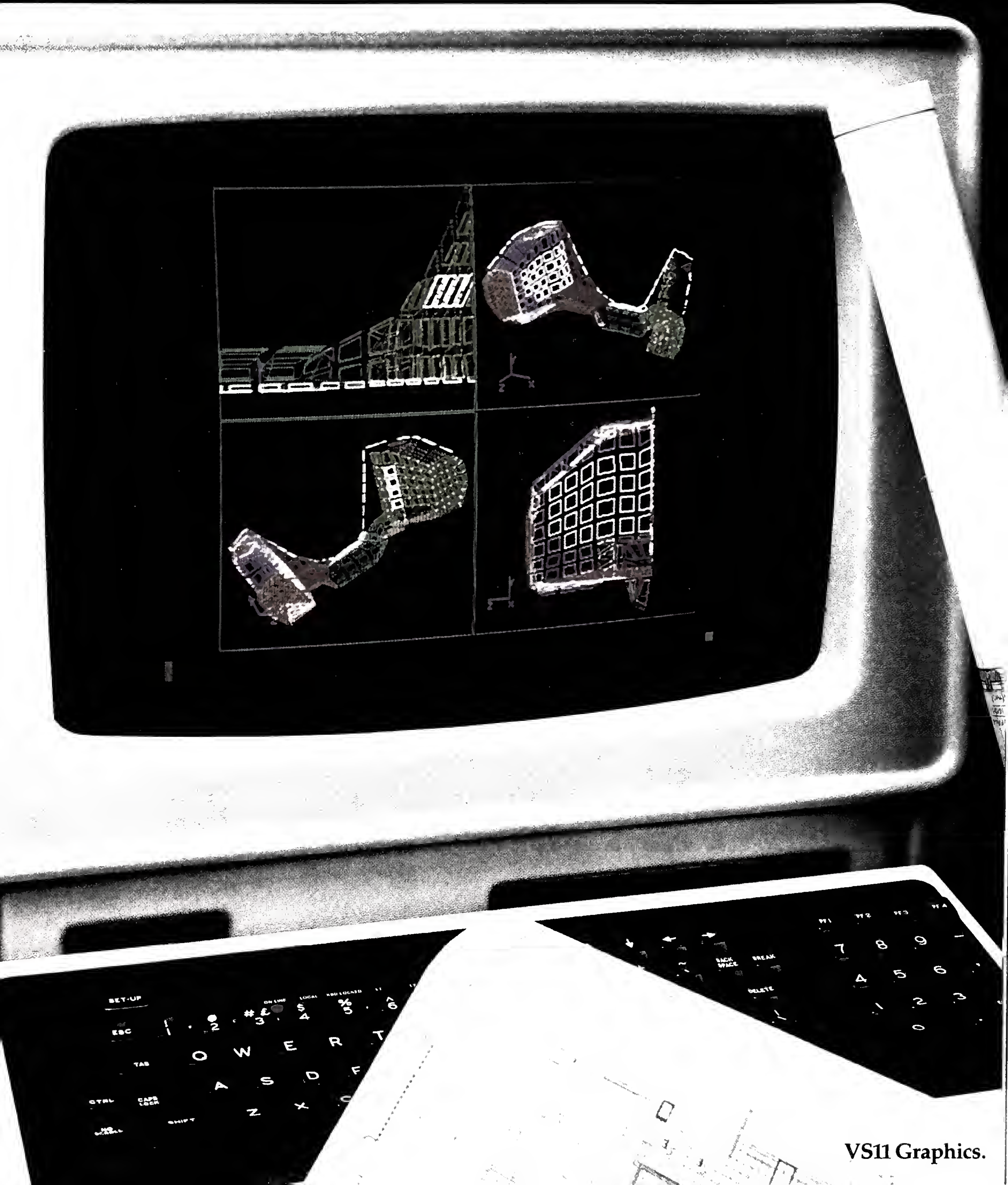
If the need for personal computing arises in the future, the VT100 is even flexible enough to handle that. In a matter of minutes, our VT18X option will turn your VT100 into a personal office computer that runs CP/M® operating software.

That means you have the decade's fastest growing family of software to choose from. With easy-to-use high level languages for a variety of applications like financial modeling, word processing, mailing lists, statistical packages and data base communications.

The VT18X package includes a single circuit board that mounts inside the VT100 chassis, plus dual 5¹/₄″ disk drives (170KB formatted) and all the necessary hardware for connections.

Add the VT18X package to your VT100, and you've got one of the most economical ways available to have both a personal computer and access to your host computer.

Commercial quality graphics for Business, Engineering or Education.



VS11 Graphics.

THE VT125. A VT100 WITH GRAPHICS.

For powerful graphics capabilities combined with data processing, the VT125 provides a unique solution. And since the VT125 is a smart terminal, it makes a minimal demand on your CPU.

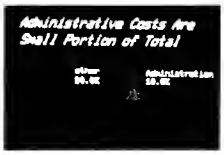
The VT125 (or VT125 upgrade kit) gives you our new ReGIS graphics instruction set that is compatible with BASIC, COBOL, FORTRAN, PASCAL or any other language you might use.

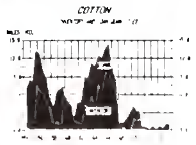
With ReGIS you can produce bit map graphics and generate vectors and curves simply and automatically, instantly transforming complex data into easily understandable charts, graphs and diagrams.

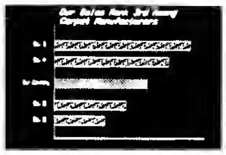
The VT125 comes with a black and white monitor. And with an optional RGB color monitor, you can display up to 4 colors from a palette of 64.

You can use the VT125 to access your data base. Or if you need hard copy, hook it up to a DECwriter IV, Letterprinter 100, or LA50.

All this in addition to the range of standard features on our VT100.







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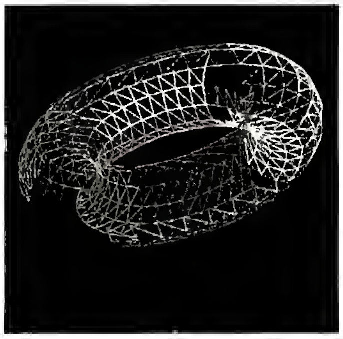

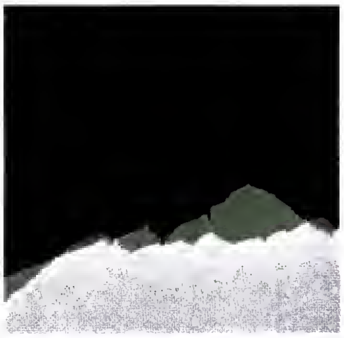

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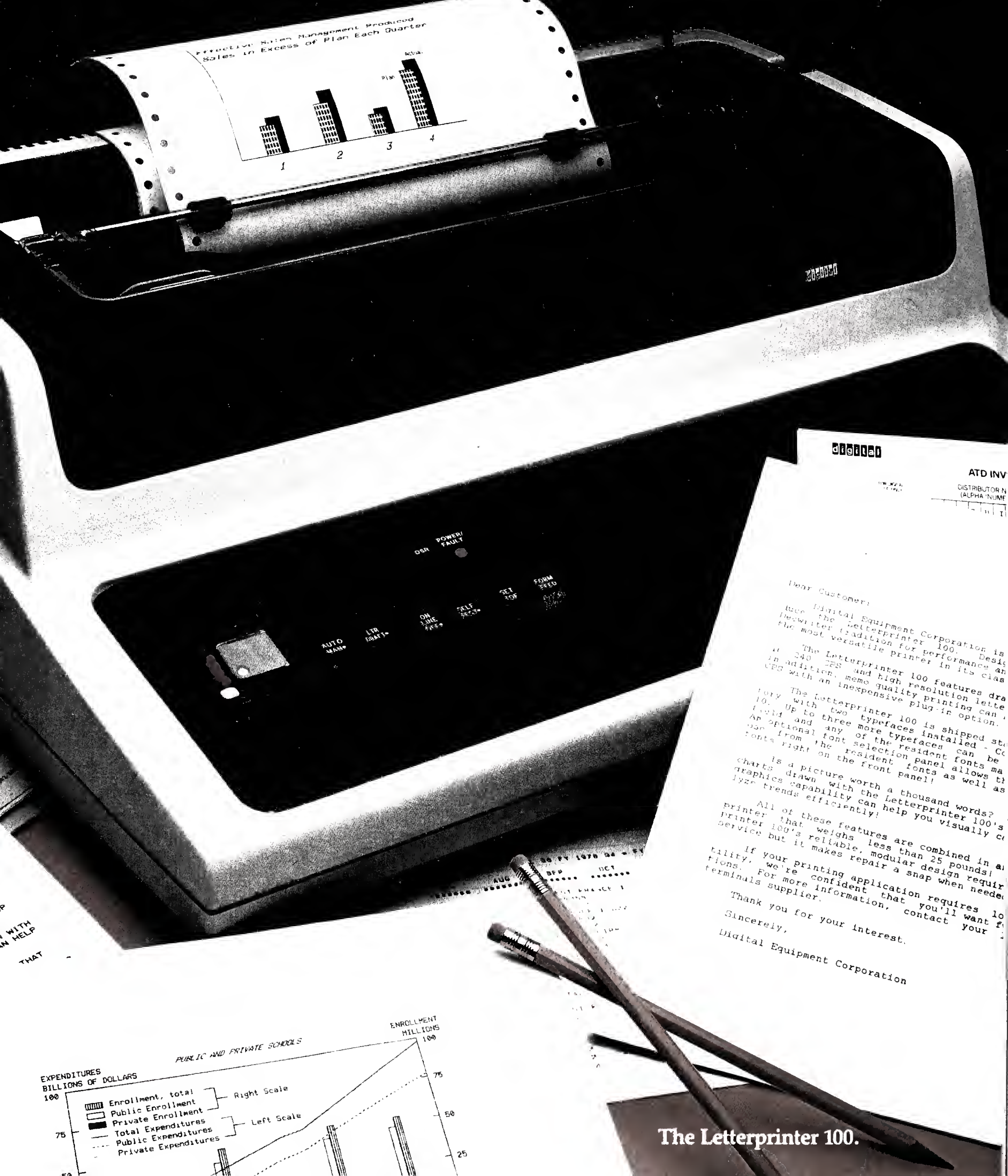

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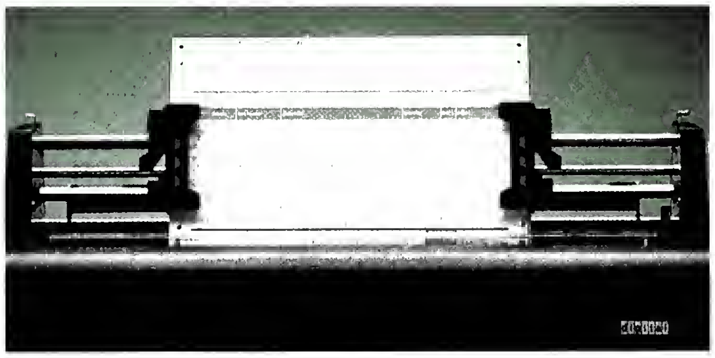

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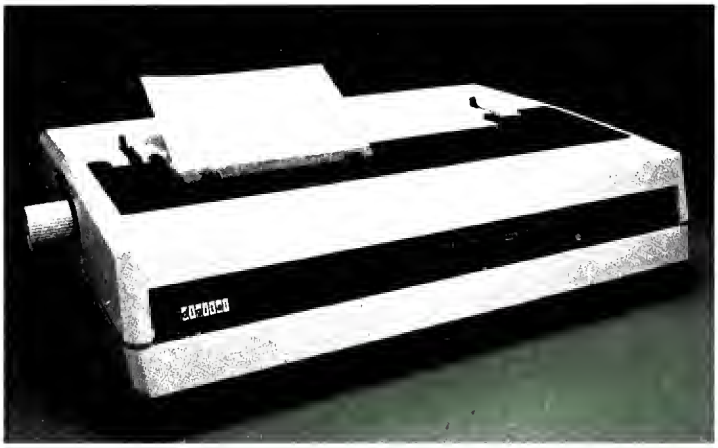

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Maximum characters per line	80/132	80/132	80/132	80/132	80/132	80/132	80/132	84	80/132
Detached keyboard	STD	STD	STD	STD	STD	STD	STD	STD	—
Non-glare screen	OPT	OPT	OPT	OPT	OPT	OPT	12″ only	—	OPT
Tilt and swivel	OPT	OPT	OPT	OPT	OPT	OPT	—	—	—
Smooth scroll	STD	STD	STD	STD	STD	STD	STD	—	STD
Split screen	STD	STD	STD	STD	STD	STD	STD	—	STD
Graphics	OPT 768x240	STD 768x240	—	—	—	—	STD 512x512	STD 768x240	—
Character/line edit	—	—	—	STD	STD	STD	—	—	—
Numeric keypad	STD	STD	STD	STD	STD	—	STD	STD	STD
Printer adaptor	OPT	STD	—	STD	STD	OPT	—	STD	OPT
Transmission	full duplex	full duplex	full duplex local echo	full & half duplex local echo	full & half duplex local echo	full duplex	full duplex	full duplex local echo	full duplex
Interface: EIA RS-232 20 mA	STD OPT	STD OPT	STD OPT	STD OPT	STD OPT	STD OPT	STD OPT	STD STD	OPT

PRINTERS	DECWRITER IV	DECWRITER III	LETTERPRINTER/ WRITER 100	CORRESPONDENT	PERSONAL PRINTER	LETTER QUALITY PRINTER
MODEL	Desk Top RO KSR	Free standing RO KSR	Desk Top RO KSR	Portable KSR	Desk Top RO	Desk Top RO
Print speed (Maximum cps)	60	180	240 data mode 30 letter quality mode	150	100	32
Maximum characters per line	216	216	216	132	132	158
Number of character sizes	8	8	8	8	5	over 100 print wheels
Multiple fonts	—	—	YES	—	YES	YES
Graphics	OPT	OPT	STD	STD	STD	—
Multiple baud rates	YES	YES	YES	YES	YES	YES
Forms handling	YES	YES	YES	YES	YES	YES
Paper feed	tractor (opt) friction	tractor	tractor (opt) friction pin	tractor (opt) friction pin	tractor friction	tractor (opt) friction pin
Print matrix	9x7	7x7	7x9 draft mode 33x9 enhanced draft mode 33x18 letter quality	9x9	7x9	full character print
Answer back	OPT	YES	YES	YES	—	YES
Non-volatile set-up	OPT	YES	YES	YES	—	NO
Interface: EIA RS-232 20mA	STD OPT	STD OPT	STD OPT	STD OPT	STD —	STD —

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Application Development Aid Encourages Greater User Involvement in Programming

Dr. Thomas Purcell

PARKERSBURG, W. Va. — As in most major companies, productivity is a top priority at Borg-Warner Chemicals here.

The company holds a leading role worldwide in supplying plastics used in durable goods such as automobiles, business machines, appliances and housing. To maintain this lead in a competitive technical field, productivity is a critical factor.

With the introduction of Cincom Systems, Inc.'s Series 80 Mantis in the spring of 1981, Borg-Warner's management information systems (MIS) department saw an opportunity to attack productivity through more efficient use of programming staff and greater end-user involvement, according to Dr. Thomas Purcell, director of MIS.

"When we began considering the costs vs. benefits of Series 80 Mantis, we were skeptical about the 5:1 productivity improvement ratio proposed in the Cincom literature," he said. "Our studies showed that a 2:1 increase in productivity would be the point at which Series 80 Mantis would pay for itself. I am happy to say that the benchmark results have met or exceeded that ratio in every area. In fact, some applications have been developed under Mantis as much as 10 times faster than using Cobol-XT," he added.

Proven Superior

In comparisons conducted at Borg-Warner, Mantis has proven to be superior to traditional programming and development methods in the following ways:

- Programmers learned to use Mantis in ratios that ranged from 10:1 to 15:1 times faster than learning to use Cobol or Cobol-XT.
- The time programmers spend developing programs is one-fifth the time required using traditional methods, which involve waiting for batch processing.
- There has been an average of a 2:1 improvement in the elapsed time from the request for a new application to the time it is in the hands of the end user.

"Series 80 Mantis has helped our current DP staff to achieve higher productivity through state-of-the-art design methodologies such as prototyping," Dave Yoak, manager of data base administration at Borg-Warner, said. "These approaches encourage the systems analyst or programmer to sit down with the end user at the CRT and design the application. The prototyping capabilities of Mantis allow us to do in minutes what had taken hours or even days using traditional methods," he added.

"There are many cases where the application delivered by data processing is not what the user really needs — and it happens for a number of reasons," Yoak said. He explained that his department completed an on-line inventory system in 1977 after six man-years of work and then learned a way to improve the system. "So what could have been a simple revision in an initial design and prototyping stage with a tool such as Mantis became a major project, and we spent another two man-years implementing the modification. These kinds of costly changes will be avoided in the future by allowing the user to interface with the application during development stages using Mantis."

Without adding any programmers, Borg-Warner has reduced its application programming backlog by using Series 80 Mantis, Yoak explained, because batch steps are eliminated and programmers develop the complete application on-line and interactively.

All information for the chemicals at Borg-Warner is processed on two IBM 4341 machines with OS operating systems. Six regional offices of the corporation are part of an on-line network accessing corporate data.

"What we are trying to do is provide the user with the means to get data necessary to make decisions," Purcell explained. "Although we don't expect Mantis to halt the movement toward decentralization, we do expect that it will at least reduce the emotions driving this trend."

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The dilemma is that the DP/MIS executive has no real recourse other than to try and meet both expectations. *Computerworld's* July 26 Special Report, "How to Get More DP for the Dollar" is geared toward helping DP/MIS people to maximize productivity while saving money. You'll get tutorial essays, accounts of user experiences, applications stories, articles — all designed to help you do more with less. You'll be getting the most up-to-the-minute information on:

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Do 'Decision Support Systems' Really Support?

By Harold L. Seils
Special to CW‡

The term "decision support system" (DSS) has come into wide usage recently, partly I suspect, because the people who have purchased such systems have been looking for information answers for so long that any system that processes information and allows analysis of it seems like it deserves such a label.

Today, there are about 70 products on the market that call themselves DSS. They range in price from $200 to $300,000. Yet the majority of them offer only part of what is essential to true decision support. Few allow the user to manage his own information.

Today's DSS have evolved either from financial modeling systems or from data base management systems. To achieve DSS status, financial modeling systems have grown data base management capabilities, while data base management systems (DBMS) have grown modeling power. The end result is a variety of software that handles two-dimensional information . . . numerical data fit into rows and columns . . . in essence, the "electronic spreadsheet."

Extended features such as graphics, risk analysis, statistics, preprogrammed functions, nonprocedural languages and preprogrammed applications are also added to round out the product offerings. Of course, since the products have become something more than they originally were, vendors have adopted the attractive label of DSS.

With all of this processing power, what can be missing? Answer: The vital element of complete information management. Because, unfortunately, not all information fits into two dimensions. Some is hierarchical (rows, columns and multiple sets of records), and other information is diverse, in multidimensional formats, requiring relational data base management.

Why Worry?

Why worry about information management? Simple budget projections do not require multidimensional information management, but other systems do, such as cash management, personnel systems, budgeting on a worldwide basis with consolidated information and multiple-layer projections for the management of products within departments, regions and corporate structure.

Even beyond the issue of integrating DSS and data base management is the importance information management has to the DSS environment. At a recent conference on DSS sponsored by Suffolk University and MIT, this question was raised by a number of participants.

Information management in the context of the DSS environment must go beyond pure integration of DBMS capabilities. Information management implies that tools are available for the executive to interface with his planning information at a conceptual level. They should provide the user with the ability to define his data base of information as it relates to a specific application and as the executive conceives that information to be organized regardless of how the information is physically organized on the computer.

The most appropriate information management approaches for a DSS environment are the hierarchical and relational management systems.

The advantages of the hierarchical system include the following:

- Fits many business applications.
- Conceptually easy to understand.
- Very efficient for appropriate applications.

The advantages of the relational manager include:

- Fits applications where the data structure is not well known.
- Appropriate for data structures that change often.
- Appropriate where little time is available for data base creation.
- Appropriate where the user is operating in an unstructured language.

The information management system should also provide a high-level English-like language whereby the user is responsible for the data base.

Over the last three years, users of DSS have become truly sophisticated in their applications of the software and continued use of DSS.

The question of the relationship information management has to the DSS environment is one of integration — putting all the capabilities in the hands of the end user to allow him to use his own data.

Seils is director of marketing for EPS Consultants, Inc.

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At Medical College of Pennsylvania

AI Model Applied to 'Data Dictionary' Design

By Dr. Paltin Sturdza
Special to CW‡

Artifical intelligence (AI) is a fairly new branch of computer science that attempts to make computers perform tasks that require some degree of intelligence: understanding human language, recognizing scenes and playing games.

Researchers in AI at various universities have combined special models with sophisticated programs in order to make computers converse in English, recognize objects and play chess at competition level.

More recently, AI systems such as natural-language data bases and the so-called "expert" systems have been produced and marketed by newly formed companies. Natural-language data base interfaces allow the user to query a system in everyday English.

Knowledge Bases

Expert systems contain "knowledge bases" that allow them to answer questions about specific topics, just as a human expert would do.

Such performance by AI systems has been made possible by the design and implementation of data models inspired from models used by humans in performing tasks intelligently.

Although there is considerable controversy in regard to how humans process knowledge, researchers agree that human information processing is event-oriented and implies the ability to make generalizations, classifications and inferences.

The use of human information processing models should not only make computers perform tasks "intelligently," and more efficiently, but should also greatly facilitate the man/machine communication process.

Having information organized in both the computer and the human brain according to the same model will make possible the creation of truly "friendly" software systems.

We have adapted from AI the Cognitive Network Model for use with the extensibility feature of the IBM Data Dictionary.

The Cognitive Network Model views the world in terms of only three fundamental categories, Entity, Event and Property. These categories are related by a limited, but universal, set of relationship types (Figures 1 and 2).

Using the Model

Now we move on to using the model. The following information must be entered into the dictionary: "Manager Joe Harley hired employee John Smith." Using traditional extensibility modeling we would have to install the categories Manager and Employee.

This article summarizes research conducted at the Medical College of Pennslyvania regarding the applicability of artificial intelligence (AI) modeling to data dictionary design.

It has been found that an AI model, by its generality, allows the data dictionary system (DDS) user to enter data relevant to any information needs without having to anticipate and install categories for each particular application.

The time and effort to implement the 'extensibility' feature of the DDS is simply eliminated. Following a one-time installation of the model, the dictionary is ready to input data about any conceivable business application.

We would also have to install a relationship type Manager/Hires/Employee to enter the specific data.

With the Cognitive Network Model, data can be directly stored by entering Manager, Joe Harley, Employee, John Smith under the category entity and Hired under the category event.

In the next step, we connect them by entering the appropriate relationships as specified below.

In the event Hiring, Joe Harley participates as an Agent, John Smith as an Object (the term "Object" simply indicates that the participant in the action suffers the consequences of the event and has no other connotation).

Instance Relationship

We have to store also the fact that Joe Harley is a manager and John Smith is an employee. To enter such classifying information we use the Instance relationship: first, between Manager and Joe Harley and second, between Employee and John Smith.

In order to enter the general knowledge that managers hire employees, we connect the two subjects to the event Hiring using the Agent and Object relationship.

The implementation of the above cognitive structure with the Data Dictionary interactive forms is straightforward: We start from the header screen and enter Event under Category and Hiring under Subject. We relate the event to its participants according to the appropriate relationships and construct thus a knowledge base for the event Hiring.

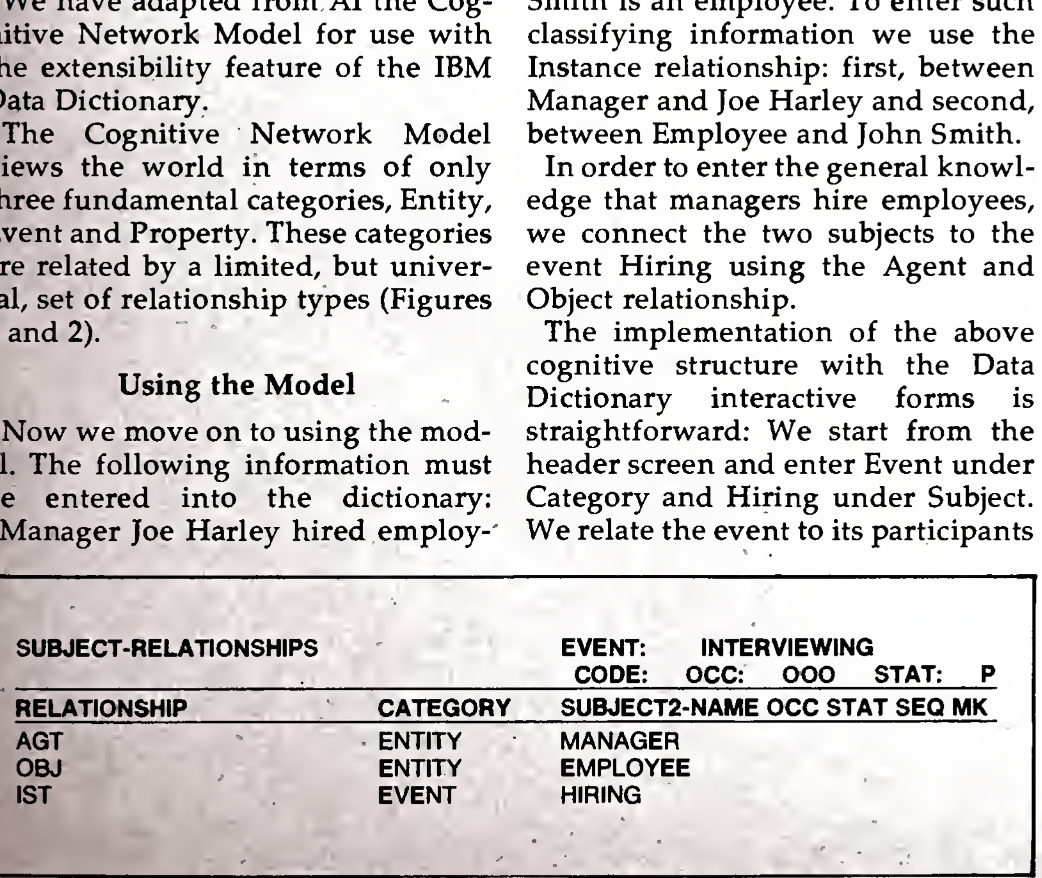
Entities (defined as anything with individual existence) can participate in events as Agents, Experiencers, Instruments, Objects, Locations or Directions. In data dictionary system (DDS) implementation terms, it means that there are only six relationship types to be installed between the categories Entity and Event.

Properties (defined as characteristics) are qualifying both entities and events. As far as implementation is concerned, we have to install only the relationship type "Qualifies" from the category "Property" to the categories "Entity" and "Event."

Events are related to other events, forming complex patterns. To build such complex structures of events, we use the following event-event relationship types: Cause, Purpose, Simultaneity, Sequence, Event-Instrument, Event-Object, Part-Whole and Cycle. In implementation terms, it means that we have to install only once eight relationship types between the Event category and itself.

The Cognitive Network Model offers also a classification scheme based on Variety and Instance relationships. These two types of relationships allow further classification within each category and eliminate the need to install new categories when new data is entered.

Figure 1: Types of Relationships in a Cognitive Network Model



```
SUBJECT-RELATIONSHIPS                    EVENT:    INTERVIEWING
                                          CODE:   OCC:   OOO   STAT:   P
RELATIONSHIP                 CATEGORY   SUBJECT2-NAME OCC STAT SEQ MK
AGT                          ENTITY     MANAGER
OBJ                          ENTITY     EMPLOYEE
IST                          EVENT      HIRING
```

Figure 3: Pattern of Interrelated Events Used in Systems Analysis

Specific information is entered by relating the general concept to the specific one by using Instance (IST) relationships. Instances of events must be numbered since the natural language does not distinguish between general and particular information in dealing with events.

The Next Step

In the next step, we complete the connection between general and specific knowledge by using the Instance (IST) relationship.

The screens would show that Joe Harley is a manager and Screen 5 indicates that John Smith is an employee.

If we want to add to our knowledge base the fact that employees are interviewed before being hired, we simply connect the event Interviewing to the event Hiring using an interevent relationship type Sequence. Our knowledge base has grown into a more complex pattern of interrelated events that could be used in system analysis (Figure 3).

Sturdza is the data base administrator in the data processing department of the Medical College of Pennsylvania and Hospital in Philadelphia.

- **Simplicity.** The model has only three categories and 24 relationship types (12 between categories and 12 within categories).
- **Universality.** The model can accommodate data relevant to any type of application. The user is freed from the necessity of predefining models before entering data. From the point where the model has been installed, the dictionary becomes ready for any input. The time and effort required by the traditional modeling techniques to design new application is simply eliminated.
- **Naturalness.** The Cognitive Network Model is based on how humans themselves process information. Learning to use this model coincides in fact with becoming aware of an already existing implicit model underlying intelligent activities. This model can be made explicit and formalized with the methodology described in this paper.
- **Ease of installation.** The model, installed only once, will accommodate any data. Category definitions and installations for new applications are thus eliminated. A deck of cards for the installation of the cognitive network model is available from the author.
- **Query capabilities.** By using the command REPORT, the user can focus on questions like "who," "when," "where" and "how" and navigate through the network according to the desired relationships.
- **System analysis and design.** Decision tables and trees and structured English are the common instruments for system analysis. The Cognitive Network Model can be used for the same purpose. If the knowledge base is used to specify processes, the dictionary becomes an "expert system," an artificial intelligence that could answer questions about system analysis and design. In our case, the dictionary does not document system analysis: The dictionary is the system analysis — a system analysis that appears as a knowledge base able to answer questions about itself.
- **Future developments.** The present model could be used for making the dictionary information accessible in everyday English. The system will require an English grammar processor (parser) which will translate the query formulated in English into network form. Subsequently, the query in network form will be translated into the necessary dictionary commands in order to find the answer.

Figure 2: Advantages of the Cognitive Network Model

Firm Bolsters DP Security With Risk Analysis

KANSAS CITY, Mo. — "What would happen to our company if the computer went away?"

This question from Farmland Industries, Inc.'s senior management prompted a feasibility study outlining all areas of security in a project plan, Roger Ramsey, the firm's DP security coordinator, explained.

"There were four concerns in the security area," Ramsey said.

"They were physical, data, employee and contingency backup recovery [disaster recovery planning]. We broke that down into different areas and activities and asked for the resources to put the plan in place," he said.

Ramsey explained that because of the magnitude of the problem and its importance, the vice-president for data processing decided to use the "risk analysis" approach.

"He felt that to better define our problem, we should quantify the risk involved. That basically was a quantification of how dependent on data processing our users were," Ramsey said.

Bob Boyd, systems security analyst for the company, pointed out that Farmland's size presented a challenge in terms of risk analysis. "We are so diversified and large," Boyd said, "a risk analysis was the answer to how to get started."

Farmland purchased software to address that concern in December 1980. It bought Panrisk, a risk analysis tool for management planning marketed by Pansophic Systems, Inc.

Risk-Analysis Tool

"Panrisk fits in here — it identifies where our priorities should be in processing, such as petroleum, fertilizer, feed, [and so on]. It told us which of our computer applications have the largest dollar volume investment in the company." Boyd said, adding that Farmland has approximately 85 major systems and that they tried to determine which systems had dollar amounts associated with them in terms of revenue (sales and profits).

"Panrisk gave us a good methodology on how to go about acquiring this information from user departments," he said. It offered the concept of quantifying risks and other guides. From that we were able to develop a questionnaire to send to our user departments with specifics."

According to Roger Ramsey, they sent the questionnaires to users and the information they received was inserted into Panrisk. "We were able to put that information in, and Panrisk, with its threats data base and delay routines, gave us rankings in terms of which systems were important," he said.

"We needed Panrisk to educate us in quantifying risk in our company. We had researched all prior literature and theories and found that Panrisk offered us an automated system that enabled us to produce a good methodology to conduct a corporatewide risk analysis and a project plan."

More Efficient

Roger Ramsey said that Panrisk was much more efficient than a manual method of risk analysis would have been.

"It is faster than any manual process we had seen," Ramsey said. "We can just plug in numbers. To do the number of calculations manually would take a great number of man-hours. We didn't have that amount of time to spend."

Ramsey said that prior to the purchase of Panrisk the risk analysis effort was in its infancy at Farmland. "We had just gotten through an approval process with Farmland's executive management asking for their support. When top management committed their support, the risk analysis project took off."

Ramsey exlained that there was a need to cost-justify their plans (for security) and to make recommendations. "We will be using Panrisk very heavily within the next four months," he said.

"We are using it to do a detailed analysis for report writing, to produce a document showing our findings from the risk analysis. This document will then be used by upper management to make decisions for alternatives reducing the various risks," Ramsey said.

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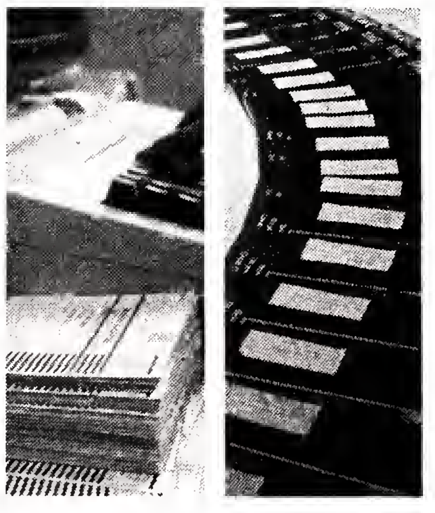

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CW6/28

User-Responsive CPU Tools Tough But Obtainable Goal

By Jeff Walker
Special to CW‡

Personal computers are built to serve users. They are interactive, flexible and easy to use. The large computer center serves the data processing staff. The nature of their solutions — "job control language," "batch" and "programming languages" — serve data processing specialists, not users.

Of course, making user-responsive central DP software is a difficult task. The central DP center must serve many users at the same time and the users are all accessing large data bases with complex processing requirements under stringent controls. But executives with access to personal computers are becoming tougher critics of central DP and are seeking fundamental changes. The computer must adapt to them; they are unwilling to adapt to the computer.

Beleaguered data processing managers are rapidly turning to two alternatives to improve user services: system development tools and application software products. I believe that the best solution will come from a merger of these two approaches — application software products built with development tools.

System Attribute	Percentage Rating Installed Users	Very Important User Planning Installation
Improved application development responsiveness	93%	96%
More rapid system implementation	89	90
Lowered costs	85	89
Reduced backlog	81	85
Increased user development in development process	31	60
Direct users access to tools	7	23

Uses of System Development Tools (From a Survey of 132 IBM Users)

tools.

System development tools can improve responsiveness to user requests and lead to a reduction of the applications development backlog. But, as the results of a survey of 132 IBM user sites reveal (see box), direct user involvement with such tools is limited. We can suppose several reasons why users are not using tools and participating in systems development:

- Most available tools address isolated system functions rather than comprehensive system capabilities.
- Major corporate systems are sufficiently complex that specialist analysts are still required.
- Control and auditing requirements may preclude direct tool usage.

Therefore, development tools are currently relegated for use by data processing staff and with limited user involvement.

Application software products can be purchased to rapidly satisfy user requirements. Unfortunately, a great many of these software products use the same early '70s technology upon which in-house data processing based its existing systems (primarily batch applications, with little integration or use of data base). Once implemented, these products often perpetuate the fundamental user problems: they are inflexible, unresponsive and require user adaptation.

The ideal solution would feature application software products built upon system utilities. Complex applications would be broken into numerous simple transaction processing modules. To be responsive, system functions would be interactive. All system interactions would be via system utility software that allows the users to simply and directly customize and tailor the system in a fashion only typical in a personal computer environment.

"User-friendly" must be in the context of the user's unique requirements; this varies from user to user. Direct user interface software, which should be used by non-technically-oriented people, would at the least include facilities to allow users to customize:

- Interactive CRT screen formats.
- Reports in both context and format.
- Data validation criteria.
- System runtime options.
- Security.
- Inquiry into the application data bases.

(Continued on SR/46)

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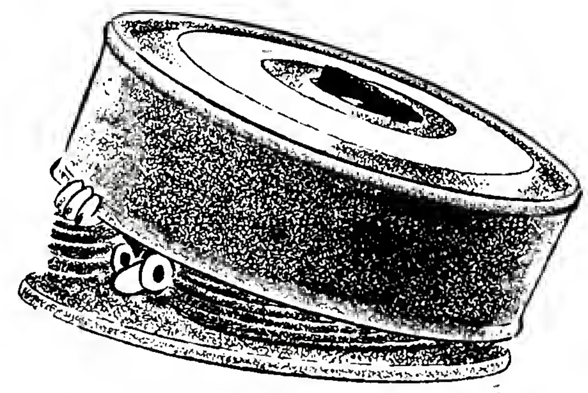

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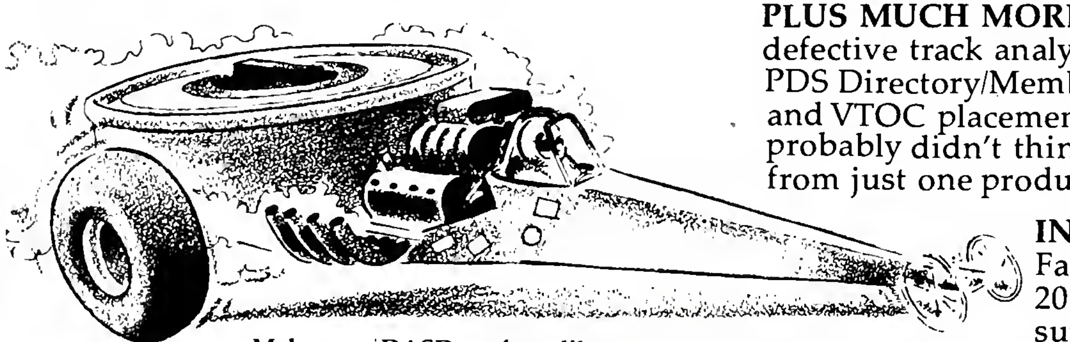

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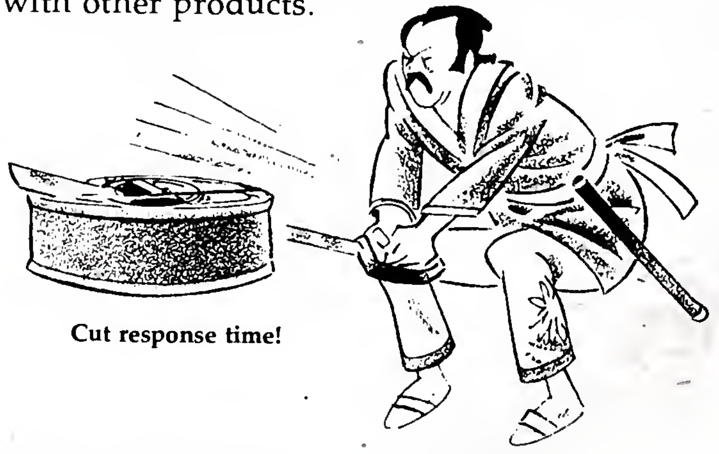

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Things Sure Have Changed

Fed Up With the Demystification of DP? Resist!

By Joseph A. Vasta

Special to CW‡

Are you fed up with efforts by management to reveal the secrets of data processing to common, ordinary users?

Are you tired of people looking over your shoulder?

Are you sick of efforts to destroy the language of data processing by making it understandable to everyone?

Are you upset by the efforts to remove the mystery (and the job security that accompanies it) from the field?

Resist, I say!

I remember the days when all I had to do was to write a few lines of code and a page or two of documentation a day in order to earn my keep. After correcting an error, I could submit a job for a test run and then wait until the next day when it was returned before I had to work on it again.

Now, management expects us to write hundreds of lines of code each day. With on-line development, we receive the results of a test run in minutes and must begin working on the results immediately. Our pay is not rising in proportion to our productivity. Are we going to allow this to happen to us? Resist, I say!

Vasta's article represents a composite of the attitudes expressed by the 'old timers' of data processing. Although it is meant to be humorous, he believes it also sets the tone for the resistance to change that exists within the DP 'establishment.'

When I started working in data processing, all that I was required to know was a few statements in Cobol and how to use a card punch. Now my brain hurts from all of the new tools that I am required to use, such as TSO, source program storage and maintenance facilities, structured Cobol and productivity aids that did not even exist in the past. How am I going to squeeze all of this in my head. Are we going to let this trend continue? Resist, I say!

In the past, I could spend two or three days looking at a dump to analyze the cause of a program bug. Now, with the aids that are available for dump analysis, even a rookie can find the cause of a dump in a matter of minutes. How am I going to learn about the techniques used to chain operating system control blocks together with packages like these available? Everyone is trying to take all of the fun out of programming. Are we going to allow this to happen to us? Resist, I say!

In the past, I could develop a new subroutine that would make processing easier for me. It was my secret. I didn't have to tell anyone about it. Now, with the "code walkthroughs," I have to share it with everybody. Are we going to allow this to happen to us? Resist, I say!

In the past, users thought that people who worked in data processing were pretty intelligent. If I made a mistake, I could always cover it up with data processing jargon. After I said EXCP, START I/O and CPU cycles a few times, I could convince any user that the computer system was so complex that anyone would have done the same thing that I did if he were in my shoes. Now, my boss says that I have to use common English to explain everything. If this trend continues, the mystery of data processing is going to disappear. The prestige and respect that went along with being a programmer will be the same as that of being a politician. Are we going to allow this to happen to us? Resist, I say!

In the past, I could go into the field and analyze a system and then return to the user with *my* system in two or three years. If the user did not like the results or if the environment of the business changed and the system was out of date before it was installed, that was his tough luck. Today, management is coddling the user. They expect us to develop a system in months. Are we going to allow this to happen to us? Resist, I say!

In the past, I could design a system any way that my little heart desired. If it was inconvenient for the user, I could always tell him that he was better off now than he was before he had the system. If he did not like it, he could lump it. Now, everyone is telling me how to design my system. I have to develop a system the way that the user wants it. If we keep this up, the user is going to think that we

(Continued on SR/46)

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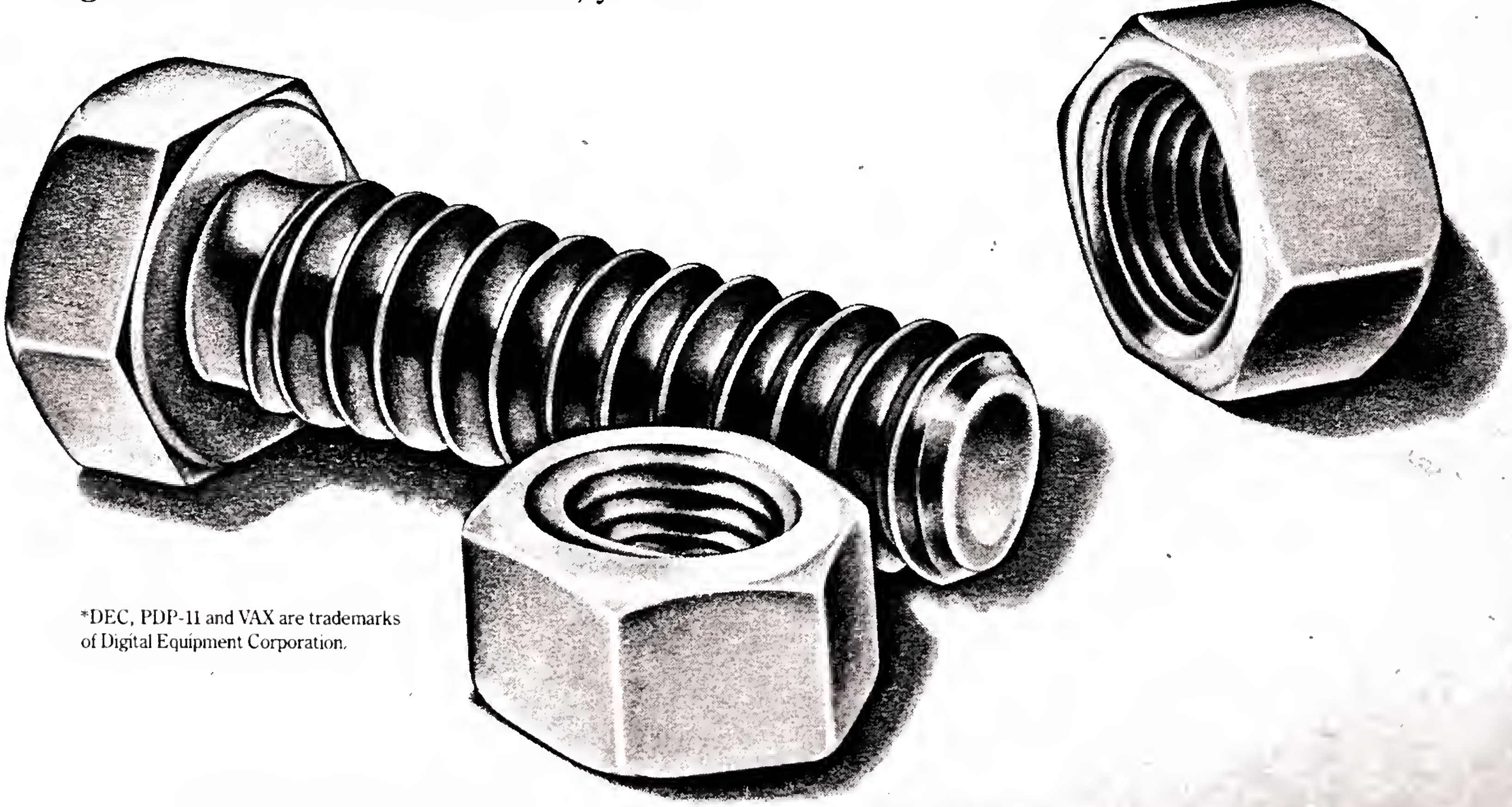

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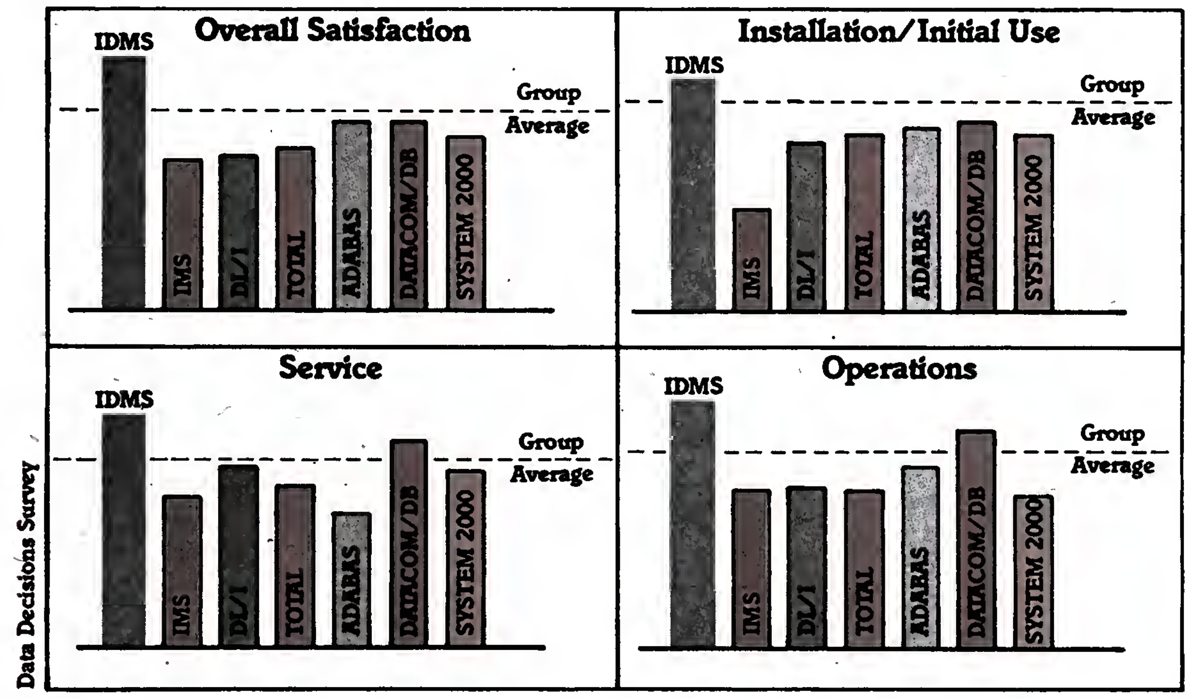

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CW/6-28

Fed Up With Demystification of DP?

(Continued from SR/44)

are in business just to serve him. Are we going to allow this to happen to us? Resist, I say!

In the past, I did not have to worry about the time estimates that I made for the installation of a project. I could estimate the time I thought it would take and multiply it by five to come up with a date. If I were not finished by then, I could get out my dart board and come up with another date. Today, everyone is looking over my shoulder. If my installation date slips by a few measly months, I have to explain the reasons to everyone. I even have to know in advance when a system will be late. All of this talk about developing systems "on-time" and "on-budget" just makes me sick. Are we going to allow this to happen to us? Resist, I say!

Programmers of the world — unite. If management wants more productivity, then we should be paid incentive for the number of lines that we code each day. Users have no right to expect us to meet all of the target dates that we establish. Just because the users make the money for the enterprise does not give them the right to push us around. We have rights too! Are we going to allow ourselves to continue to be oppressed by this new environment? Resist, I say!

Vasta is an assistant professor of computer science at a community college in Maryland. He has worked in the DP field since graduating from the University of Maryland in 1966 and has developed the firm belief that "it is much easier to educate a nontechnician in the new facilities of the industry than to educate technicians within the field."

Center Must Serve Users

(Continued from SR/42)

- System documentation.

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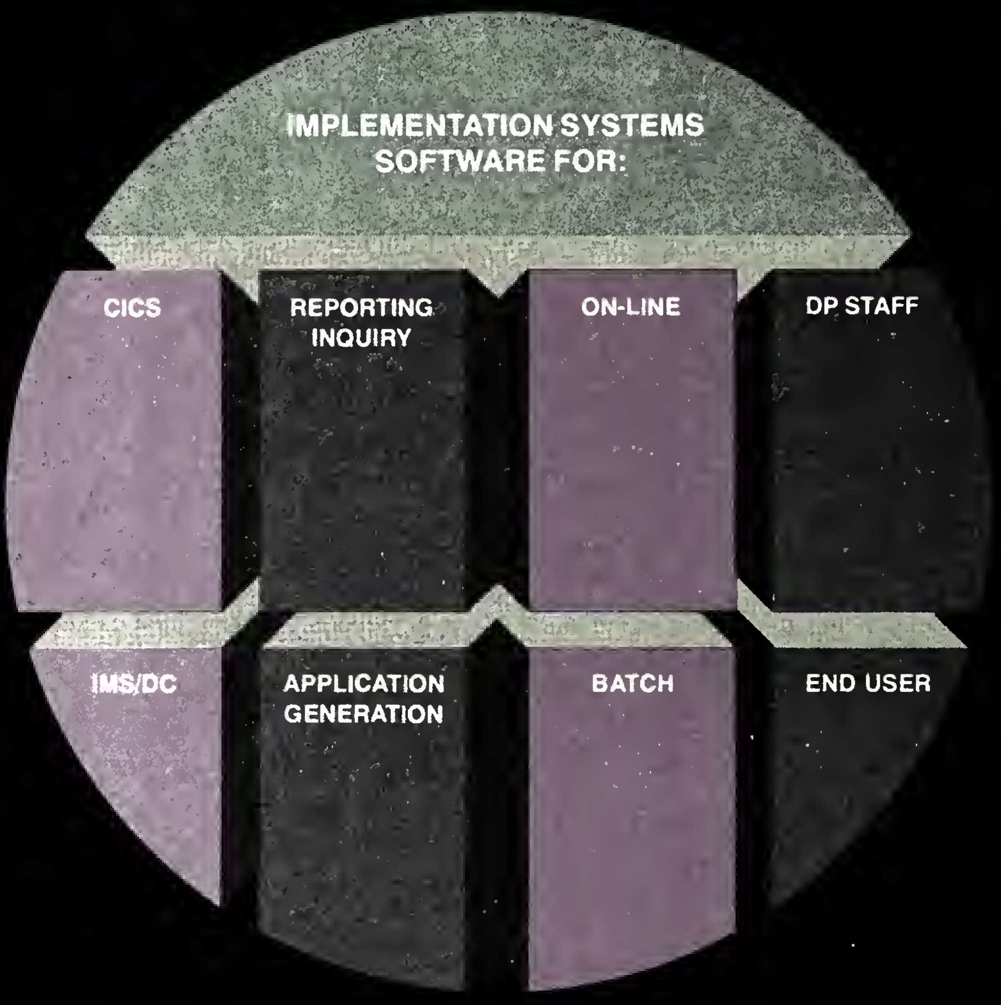

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Package Helps Du Pont Programmers Maintain Old Programs, Create New Ones

MISSISSAUGA, Ont. — Du Pont Canada, Inc. determined last fall that it needed a product to help maintenance programmers effect program changes and to "draw" structure charts with a computer, using pseudo Cobol, to assist in the design of new programs.

The package it selected was Programming Machine/Software Solutions (PM/SS) from Adpac Corp. of San Francisco.

Despite the original acquisition purposes, a review of the PM/SS options revealed that it could provide computer assists in the arduous task of developing a corporate data model from existing Cobol programs, according to Eric Garrigue Vesely, a Palo Alto, Calif.-based consultant specializing in data base design who was part of the evaluation team.

Robbie Robinson, manager of the Systems and Computer Services Division, authorized Frank Friedman, manager of systems development and support, to establish and manage a task force to develop a logical data model for a particular application area, Vesely recalled.

Order Entry System Chosen

Friedman chose the order entry system because it was small, he explained, and established the task force, getting the project off the ground last Jan. 11. Its budgeted completion date was April 15.

"The first task was for me to instruct the task force on entity-type analysis, normalization, logical data modeling and using PM/SS assists," Vesely said.

The task force established the following entity-types for order entry: customer, product, Du Pont organization, general ledger, Canadian provinces and foreign governments and foreign currency. Customer and product are generalized entity-types since Du Pont Canada has a large variety of customers and products.

"Rather than have a separate logical data model for each type of customer and for each type of product, they are combined into a single entity-type with a status data element to define the exact relationship of an entity-type of Du Pont Canada at any moment of time. This simplifies the entire logical data model and reduces redundant data elements," he explained.

According to Vesely, Du Pont Canada organizations and general ledger are "stroke-of-the-pen" entity types not really capable of independent existence and subject to instant modification or destruction by reorganizations. However, Du Pont Canada does need to maintain independent data about them and therefore they must be treated as entity-types.

Synthesis Function

"PM/SS via its synthesis function was used to obtain a structure chart of how the programs related to each other by analyzing the operational JCL. The eleven programs were placed into a PM/SS library for further analysis," he said.

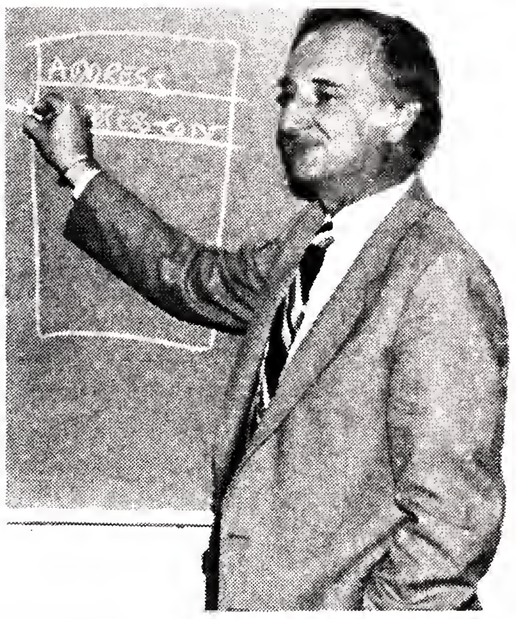
The first PM/SS analysis was to list all data element names in all programs in alphabetical sequence eliminating duplicate names with duplicate logical pictures. The 11 programs produced a list of approximately 3800 unique data element names.

The next task was to isolate and eliminate homonyms (two or more data elements with identical names, but different logical pictures). Fortunately, the order entry system had minimal homonyms.

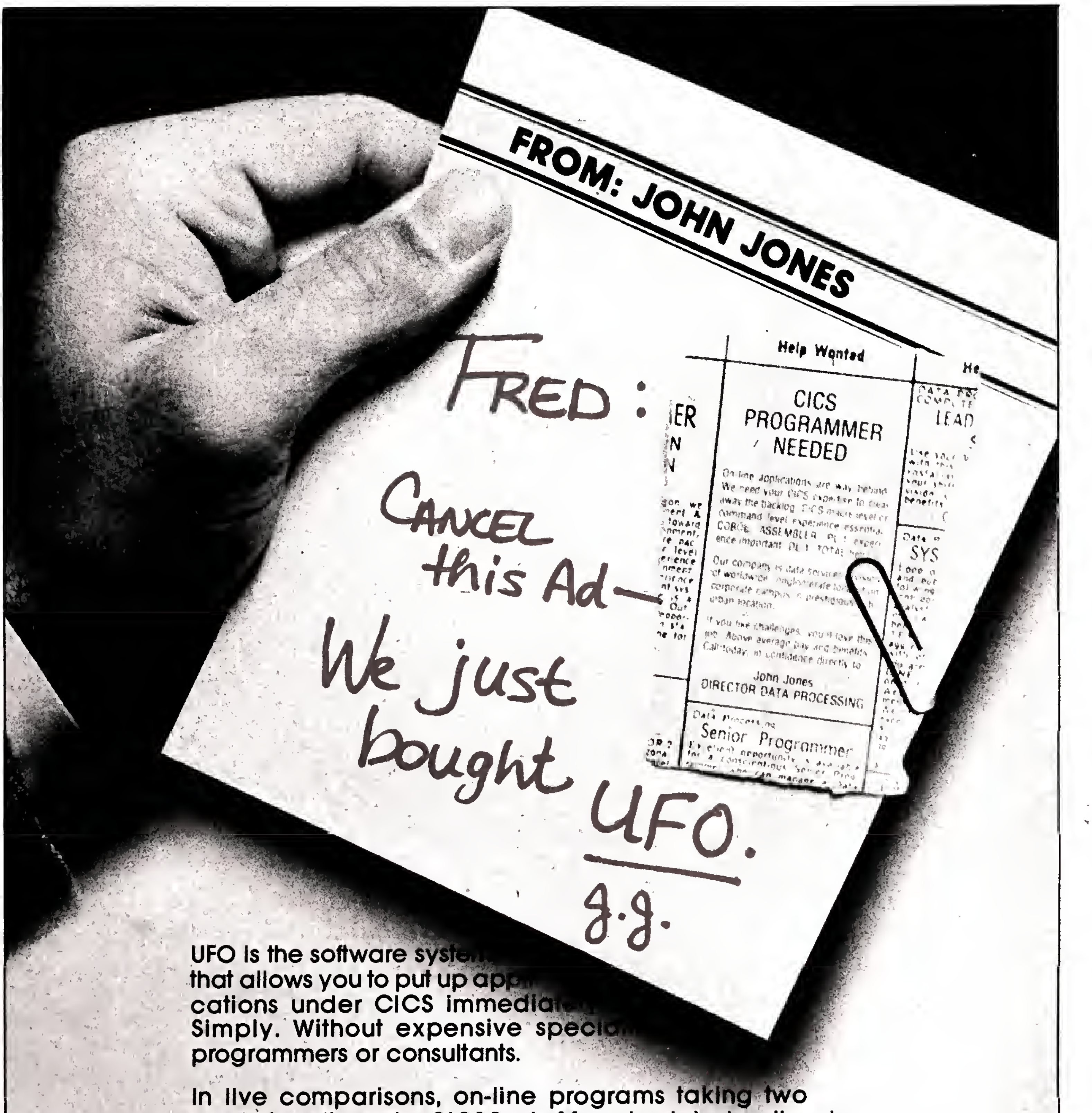
The next task was to isolate and eliminate aliases (different name for the same data element) and synonyms (different data representation of the same data element).

"PM/SS cannot by itself isolate aliases and synonyms but can assist by printing sorted alphabetical lists by logical and physical lengths. Questionable data elements can be further analyzed by having PM/SS list all the Procedure Division statements that used the suspect data element," Vesely continued. "Finally, PM/SS can identify most derivable

(Continued on SR/48)



Consultant Eric Garrigue Vesely was part of the evaluation team.



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HBO Switches on a JCL Proc Evaluator

NEW YORK — Considering its high volume of development and maintenance activity, standards are of great importance to the Information Services Department of Home Box Office (HBO).

The department has been in existence for less than three years and it has grown to over 70 people. The HBO data center currently is running an Amdahl Corp. 470V/7B under VM/CMS and a Control Data Corp. Model 3 under MVSSP.

It is faced with a host of traditional problems — an insatiable need for resources such as disk space and constant operator intervention in JCL-related problems, to name but two.

While the department has printed standards, it found that these tended to be unenforceable, partially because they could be arbitrarily interpreted, John Granaghan, director of the Computer Services Group, explained. As an alternative, his department installed JCLegislator, a software product marketed by The Productivity Group, Inc.

JCLegislator is an automated tool for JCL Proc evaluation and standards enforcement through the application of JCL syntax rules and naming conventions that are supplied with the package and can be supplemented or modified by the user organization.

Two Benefits Provided

According to Granaghan, JCLegislator provides essentially two benefits to HBO:

- It can be used in ongoing development and maintenance procedures to ensure that all production programs and systems have Procs that adhere to standards.
- Its preprocessor will review and modify all existing Proclib members in a single pass.

At HBO, JCLegislator is used by the programming staff to adhere to JCL standards prior to turning programs over to the operations staff, he continued.

The software provides a number of general capabilities as well as features specifically directed to each Proc statement type. First, each Proc statement is analyzed to ensure that the operand and operation fields start in the correct columns, reviewed for correct interrelationships to other statements and reviewed for adherence to the standards encompassed in JCLegislator, he explained.

JCLegislator produces BLDG statements for all generation data sets that are found not to have generation

Order Entry Effects Changes

(Continued from SR/47)

data elements by analyzing the Procedure Division. I recommend that the algorithm used in calculating the data element be recorded, but that the derivable data element be eliminated from the data model. The rationale is that the normalization process is simplified."

The Du Pont Canada task force shifted and winnowed the original 3800 data elements and, by eliminating homonyms, aliases, synonyms and derivables, reduced the data element list to approximately 150.

The next step was to "cluster" each of the remaining data elements by its entity type. The task force had to decide of which entity type each data element was an attribute. Additionally, each data element was analyzed to determine if it was "repeating" (the data element had from zero to N values per entity-type occurrence).

First Normal Form Analysis

The task force then performed first normal form analysis on each entity type by removing each repeating data element to its own data structure (relation).

"The resultant first normalized relations are usually also in second, third, fourth and . . . normal forms because derivable data elements have been eliminated and the remaining data elements have been clustered by entity type. Second, third and "N" normal forms have become validation techniques," he said.

The task force converted the "final" normal forms to a "logical" Bachman diagram to achieve graphical simplicity. The logical Bachman diagram was reviewed with the analyst team developing the new order-entry system to determine its validity.

The walk-through proved that the theoretical model developed without consulting the current revision team was valid and appropriate to their needs. Their additional tasks and additional data elements would have to be added to the logical data model.

"The completion of the original data model was finished approximately one month ahead of schedule. I personally believe it could not have been done without PM/SS," he concluded.

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And Keeps Its System Standards in Focus

pointers in the catalogue. These BLDG statements are needed as input to a subsequent IEHPROGM utility run to initialize generation pointers. In the Proc statement, JCLegislator analyzes each PROCEDURE NAME that must be present and must follow naming standards, at the same time ensuring that all symbolics conform to standards.

For EXEC statements, JCLegislator ensures that each STEP NAME is present and follows naming standards, verifies that each REGION PARM is present and nonsymbolic and ensures that each program name conforms to naming standards.

For DD Statements, JCLegislator verifies that the DDNAME follows naming standards, evaluates each DD statement parameter to those permitted by standards, ensures that for RECFM=FB or RECFM=FBS the BLKSIZE is divisible by LRECL and verifies that the SPACE PARM needs a round option if it is in blocks and greater than half cylinder.

It also ensures that the DSNAME follows naming standards, validates that interrelationships are correct (no SPACE PARM specified if unit is tape, for example), ensures that output data sets have DCB information and ensures that each step has a SYSUDUMP statement.

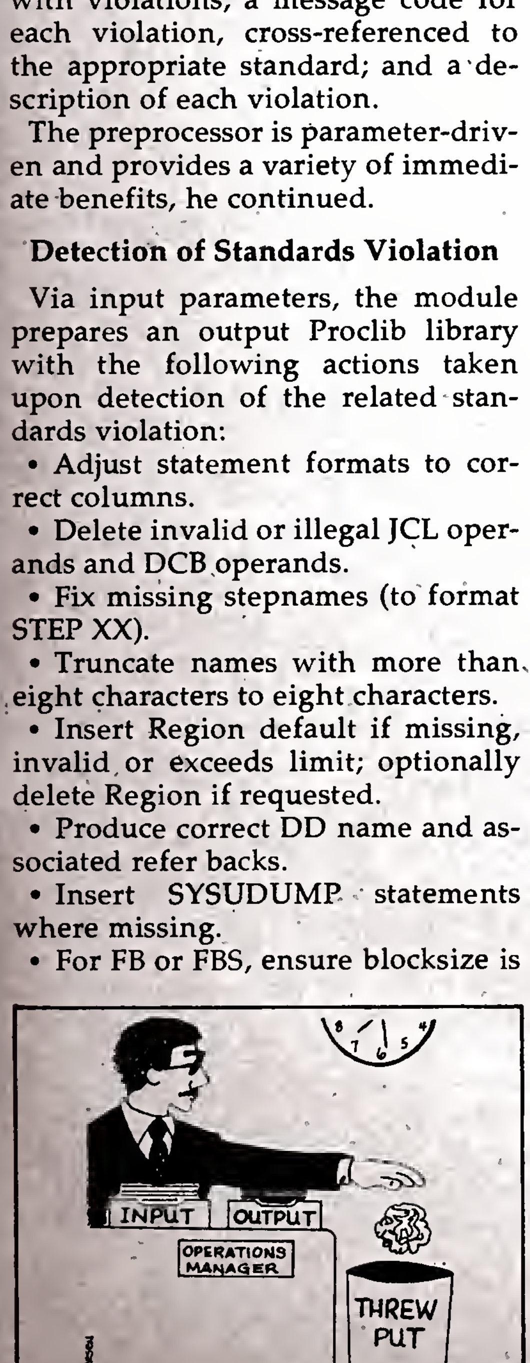
"Overall, JCLegislator prepares a Standards Violations Report which fully documents the detection of nonstandard or unacceptable Procs," Granahan said. Included in this report are the original JCL statement with violations; a message code for each violation, cross-referenced to the appropriate standard; and a description of each violation.

The preprocessor is parameter-driven and provides a variety of immediate benefits, he continued.

Detection of Standards Violation

Via input parameters, the module prepares an output Proclib library with the following actions taken upon detection of the related standards violation:

- Adjust statement formats to correct columns.
- Delete invalid or illegal JCL operands and DCB operands.
- Fix missing stepnames (to format STEP XX).
- Truncate names with more than eight characters to eight characters.
- Insert Region default if missing, invalid or exceeds limit; optionally delete Region if requested.
- Produce correct DD name and associated refer backs.
- Insert SYSUDUMP statements where missing.
- For FB or FBS, ensure blocksize is a multiple of LRECL.



- Insert ROUND if needed in space parameter.
- Delete space for tape data set.
- Insert CONTIG parm for Isam files.
- Make SYSUDUMP or SYSABEND to SYSOUT=S.
- For VB or VBS, ensure that block size is divisible by the LRECL+4.
- Ensure that for Dasd the maximum block size is 19069.
- For tape, ensure the maximum block size is 32767.
- Delete RLSE where not allowed.
- Insert RLSE where required.
- Insert or correct model DSCB where required.
- Change DISP or SHR for appropriate systemwide data sets.

Upon request via an input parameter, JCLegislator will also validate each data set against the system catalogue where VOLSER, UNIT are not specified. If the data set is not found in the catalog under this circumstance, a warning message would be printed in the Standards Violations Report to note this potential runtime error.

"The JCLegislator package has proven effective, allowing less technical people to make corrections to JCL and by releasing unneeded resources such as disk space for other tasks.

Most important, however, is JCLegislator's effectiveness in reducing operating intervention, thereby improving the throughput of jobs in and out," Granahan said. "JCLegislator's impact on standards enforcement has been critical.

"The software promotes a high degree of acceptance by removing ambiguity from standards interpretation and by making the enforcement mechanism nonhuman. HBO's use of JCLegislator provided immediate payback and has been a significant advantage."

"The proliferation of financial planning languages will create chaos throughout corporate management ranks. In the future, we will see one standard modeling language that extends from the personal desk-top computer to the central corporate information center."

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Pharmaceutical Firm Solves Dasd Headache

RAHWAY, N.J. — As early as 1976, Merck and Co. here had determined that it needed a better way to manage the Direct access storage device (Dasd) resources in its IBM MVS TSO environment.

The company selected Automated Space Management (ASM2) software from The Cambridge Systems Group, and ASM2 has been the basis of TSO Dasd management operations at the Rahway, N.J.-based pharmaceutical firm, since that time.

In 1981, the existing management procedures were studied to determine how enhancements to Release 2.5 of ASM2 could best be utilized at Merck. Robert Vacca, systems associate for Merck, has installed three releases of the product since 1976 and knows the product well.

Greatest Strengths

Vacca said one of ASM2's greatest strengths is the ease with which it interfaces with other software products installed at Merck, particularly with SPF and the tape management system in use at the Merck data center. ASM2 has significantly reduced the overhead associated with increasingly complex computing environments. Usage characteristics of the data itself determine the media on which the data should reside.

Much of what ASM2 does depends on information contained in the Volume Table of Contents (Vtoc). Native IBM code maintains last access date and the "data set has changed" bit (selectable Unit 60). Modifying the IBM "OPEN" modules, ASM2 maintains, in addition, a cumulative use count, last modification date, last modification time, and the TSO user ID or batch job name of the last modifier of the data. ASM2's reporting and preprocessing facility, RSVP, has enabled Merck to report on data sets' space allocations, space used and data last accessed to determine whether a data set should be archived to a less expensive medium. With this additional information, the firm is better able to establish the criteria for ASM2 to make decisions automatically on the appropriate storage medium for the data, Vacca explained.

Data Set Activity

ASM2 determines which data sets have been modified since the last backup was run. The incremental backup facility then backs up only those data sets that have the change bit on; that is, only modified data is backed up. At Merck these data sets are dumped to a predefined pool of tapes with a 16-day retention period. This ensures they will be held at least until the next full-volume backup, done weekly at Merck.

As data sets are dumped to tape, entries are made into a backup catalog. This allows a user to inquire about the status of backed up data sets. Incremental backups are run daily as part of the operational scheduling system. According to Vacca, Merck now backs up only 1,100 data sets daily, compared to more than 25,000 data sets it would have to back up without the incremental backup facility.

Along with incremental backup, Vacca cited queued reload as one of the most cost-effective facilities of ASM2. Queued reload combines the convenience of an interactive retrieval facility with the operational efficiency of batch retrieval. The user issues a command to request the reloading of an archived data set. These requests are queued for a later batch job. ASM2 program logic checks the queue periodically. If X number of data sets are queued, and if a data set has been queued for at least N number of minutes, the batch job services the request.

All requests prior to the actual reload are sorted by file sequence number within the volume serial number of the archive tape. Example: 12 requests on ASM130; 14 requests on ASM150.

Each group of requests is sorted by file sequence number. Therefore, only two tape mounts are required.

Additional Functions

Most of ASM2's facilities for data management are used by Merck. Some of the other functions (and their implementation at Merck's installation) include:

- Full-volume backups (weekly).
- User-requested archival (twice weekly).
- System archival — based on data set inactivity, volume serial and data set organization (twice weekly).
- RSVP for reports (weekly).
- RSVP to preprocess for other functions (twice weekly).
- Space compression (twice weekly).
- Reporting on Vsam data sets (twice weekly).

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DPer Boosts Job Speed by Tinkering With JCL

SANTA CLARA, Calif. — One way to make jobs run faster without burying your nose in the logic of a program is to first try tinkering with the job control language.

The results can be dramatic — as a case from last December shows. A job that first ran in seven hours was made to run in less than four hours — just by changing the JCL, Bob Davies, a systems programmer for On-Line Business Systems, Inc. (OBS) here explained.

"A major competitor for Ma Bell's long-distance business was trying to model 20 years of telephone demand and capacity. Its model ran over 10 hours on an in-house IBM 3031 so they began searching for a service bureau with the capacity to handle the model in a more realistic wall time," he said.

OBS won the contract to run the client's model on the basis of having a recently installed IBM 3081. "Because wall time was a critical issue, the contract between OBS and the client guaranteed a four and a half hour turn-around time for the model," he explained.

Penalty Fee

In addition, the contract specified that there would be a $250 penalty per hour or fraction thereof if the model ran more than four and a half hours.

"Once the contract was signed, the race was on to make the model run in four and half hours. With no time to look at the internals of the model, the only choice was to modify everything but the program — which left almost nothing but the JCL," he continued.

	AVG TIME/JOB	TOTAL WALL TIME
CASE 1 (worst)	4.35 min	5.44 hours
CASE 2	4.10	5.13
CASE 3	4.02	5.02
CASE 4	3.73	4.66
CASE 5 (best)	3.16	3.95

CASE 1	Average times before any of the JCL changes.
CASE 2	Average times when SPACE allocation was accurately computed.
CASE 3	Average times when SYSOUT data sets were replaced with real data sets.
CASE 4	Average times when a single combined load library was used.
CASE 5	Average times when CATALOG references were removed.

What Happened When the JCL Changes Were Implemented

Since the initial cut at running the model took over seven hours during a busy weekday, the following recommendations were made:

- Dedicate an initiator with a higher dispatching priority than other batch jobs.
- Increase block sizes to the maximum.
- Reduce the number of steps to the absolute minimum; rename a data set rather than copy it; combine steps if possible.
- Locate frequently used data sets on cylinder boundaries and near the Vtoc of the pack to reduce arm contention.
- Locate the client's pack on the string and channel with the least usage to avoid contention with other systems.
- Eliminate all STEPLID DD's and use a JOBLIB DD, thereby reducing step allocation time slightly.

"All of the above recommendations are natural attempts at improving wall time and more important, they carry little or no penalty," Davies explained.

"Increasing the block size will increase the memory used but this is a common trade-off. Paging I/O is the most efficient of any in the system," he said.

After the first set of changes the client's model ran in over five and a half hours on a quiet 3081, still less than the contractual obligation of four and a half hours. A second pass would have to be made, this time concentrating more on the JCL, he continued.

JCL Changes Make Difference

The surprising result was that the following JCL changes did make a lot of difference:

- Eliminate all CATALOG references, using explicit volume allocation instead.
- Combine all LOAD MODULES (even and especially IEFBR14) into a single JOBLIB, eliminating search time for dynamically loaded modules.
- Eliminate all SYSOUT data sets, avoiding any interface with JES2, the spool subsystem.
- Code each SPACE allocation with the exact amount of space instead of over allocating and letting the system release the unused tracks, or worse, under allocating space and going to multiple extents.

But each of these recommendations had a trade-off:

- The CATALOG is usually essential to finding data sets. In this user's case, however, all the data sets were on a single disk.
- Combining all the LOAD MODULES into one JOBLIB meant making a copy of the PL/I transient modules in a private library — not a good idea for maintenance.
- SYSOUT data sets are convenient and eliminating them meant work.
- And lastly, it was a difficult to review the SPACE allocations and make them accurate. Worse, they must be maintained — the data sets could increase in size and go to multiple extents.

The net result of the second set of recommendations was that the model ran in three hours and 10 minutes on a stand-alone 3081 while on a busy weekday the model ran in close to four hours, both under the four and a half hour obligation, according to Davies.

Effect of Recommendations

"Out of curiosity, the effect of each of the second set of recommendations was broken down and analyzed. It should be noted that each program or system is unique and therefore, the following statistics should not be taken too literally. The statistics are useful only as far as they indicate a trend," he said.

The model consisted of 75 jobs with seven steps each and was written entirely in PL/I. The system was largely compute-bound with only several hundred SIO's per job.

Because the SIO counts for the job are low, the SIO's for any Vtoc or CATALOG update became significant, according to Davies.

Each of the four JCL changes in the second set of recommendations was implemented one at a time. For instance, as the chart above shows, Case 1 has no changes, Case 2 has one change, Case 3 has two changes, and so on.

"Except for removing SYSOUT data sets, each JCL change resulted in a noticeable reduction in wall time. The net effect of all the JCL changes above was a full minute and more shaved off each of the 75 jobs, an hour and half less total time for the whole job steam," according to Davies.

"Not every job stream can use the above recommendations," he added. "For instance, the CATALOG must be used when data sets are spread over several packs. Even using the above JCL changes, some jobs may not realize an appreciable reduction in wall time. However, changing the JCL can be a good first step in improving performance."

Drugstores Develop On-Line Programs By Utilizing a Painless Bypass for CICS

PORTLAND, Ore. — A major drugstore chain here was unable to develop its on-line programs in RPG-II under IBM's CICS without an assembler interface until an application development aid was added to its system.

All of Payless Drug Stores N.W. Inc.'s batch programs had been written in RPG-II; the on-line programs were in assembler. Although the firm had been on line for about eight years, its DP staff could not write RPG-II within CICS without an assembler interface.

Payless Drugs installed Insac Software, Inc.'s CPS — The Language — in May 1981 because it was designed for writing on-line programs without having to understand the internal workings of CICS. Its central routine library handles the CICS macros and is said to be similar enough to RPG-II to require very little training for RPG programmers.

Payless Drugs Stores N.W., Inc., with sales of $750 million in 1981, is a major drug chain in the Northwest. Started 40 years ago, Payless now has 150 stores in Oregon, Idaho, Washington and California. Jim Baer, vice-president of data processing said, "CPG has facilitated new design changes very well."

Simple Program Changes Key

Because all of Payless' applications have both batch and on-line programs associated with them, writing the programs in the same language, CPG, provides a smoother transition and saves programming time. Most new applications that are put on the system now are written in CPG. According to Baer, "The key is CPG's ability to simplify program changes."

As part of the system, CPG helped Payless develop a record management system for historical records in an off-site warehouse, a sales analysis application and merchandise budgeting systems.

"Flexibility has to be the No. 1 benefit," says Baer. "I believe that in any system or operation, what kills it more than anything is inflexibility. The ease of making a user's change in a timely fashion is extremely important."

Less Time-Consuming

Baer refuses to put his users on a schedule six months "down the road." He said, "I've always given my users response time and turnaround time on request. CPG, which is less time-consuming, makes this easier."

Payless Drugs' DP operation in Wilsonville, Ore., houses an IBM 3031 running with a DOS/VSE operating system. Seven hundred 3270-type terminals are located in 150 stores. The network is supported by two systems and programming personnel. In selecting a programmer development aid, Payless looked at IBM's DMS but was unhappy with its restrictions. DMS has too much overhead and was not as similar to RPG-II as CPG.

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With this thought firmly in mind, Gravois Bank here purchased ESI, Inc.'s Job Flow Computer resource management package on its Burroughs Corp. B3700. The bank has been a Burroughs user since 1976 and now has contracted to purchase a B3900.

Jack Canavena, a vice-president and DP manager, explained that the firm purchased Job Flow in 1978 after learning abut it at a Burroughs users group meeting.

"It's the best money we've ever spent . . .. for a piece of software. I don't think there's one other piece of software that I can say I've derived more benefit from," he said.

Multitask-Oriented

Job Flow was designed to take advantage of Burrough's multiprocessing capabilities by controlling multiple tasks and even multiple jobs at once. It also assures the data processing management that jobs are always run properly and in the correct sequence.

When asked how important this capability was to his shop, Canavera replied, "I'm doing work for four other banks who contract with us on a service basis. We're talking about maybe the recreation of an entire shift's work because something was missed. It's that important.

"We don't have the ability in my kind of environment to say, 'Well, we'll correct it and redo it for you tomorrow.' Reports have to be there that day; they have to be correct that day; and the on-line system has to be up and working with the correct files that day. It's not like . . . a billing invoice [that] is done wrong. We could rerun that and have . . . a new bill tomorrow.

"We're under the gun — I have deadlines I have to meet. People expect the reports to be on their doorstep that morning, and in that kind of mode you can't take chances. You have to do what you can to . . .get the work done properly," he said.

Simple to Use, Change

He described Job Flow as simple to use and easy to change.

"You can have an operator or someone with a nonprogramming background lay out the tasks. There's no investment in sending them away to school. It's easy enough to be picked up."

All shops encounter the occasional time when the sequence of steps in a job has to change for one specific night. Canavera feels that Job Flow handles this circumstance easily and well.

"It's just a simple recompile of Job Flow which is very, very fast to do. It has the flexibility even as it's running to make some changes in the means in which it's operating. So we do have flexibility there and the ease of change." he feels.

Many operational errors occur during the training of new operators. When new operators are trained at Gravois they come into "a very controlled environment. Their main concerns are getting the data in and putting up, hopefully, the right tapes. With Lionl — the ESI tape library management system — and Job Flow working together on that now . . . we're going to make sure that the operators put up the right tapes."

Job Flow and Lionl, as members of the ESI Plus family of integrated environmental software, communicate information concerning the appropriate tape input for a job.

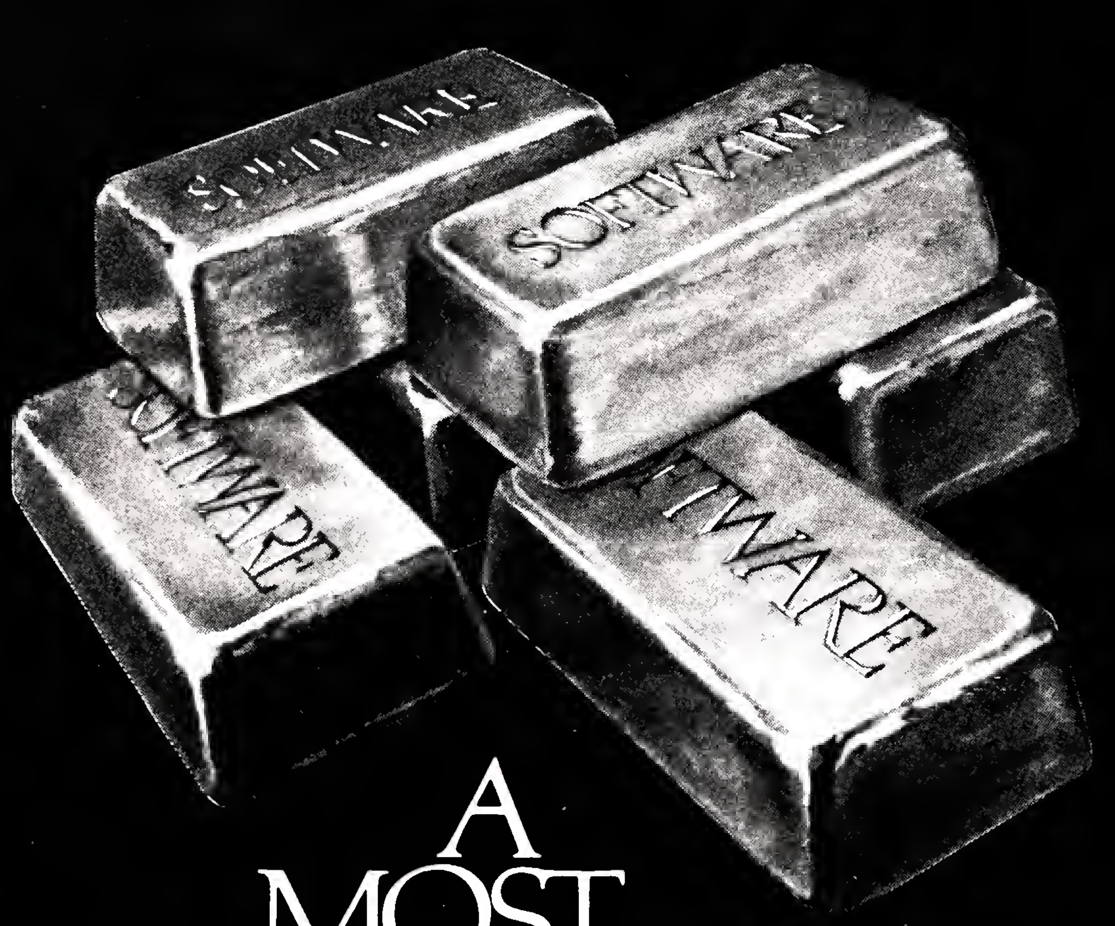
Concerning the amount of time required to code a Job Flow job, Canavera said, "The first one I did took 15 minutes. You may spend several hours . . . because of the complexities of what you want to do. It's just a matter of what you want to do, how you want to do it, and what resources you want to use."

Job Flow Simplifies

Restart procedures are greatly simplified with Job Flow, he said. "Unfortunately, operators will occasionally DS the wrong program and it's happened that they've DSed the Job Flow Manager.

"I've been told in a Burroughs seminar, (if) you DS Workflow . . . you lose all the programs controlled by it. In Job Flow when that has happened, it's just a matter of reexecuting Job Flow. At that point, he knows he's been killed. He'll say, 'What do you want me to do?' and you send him back to where he was."

Jack Canavera's final comment on Job Flow was, "It's our top dog as far as I'm concerned."



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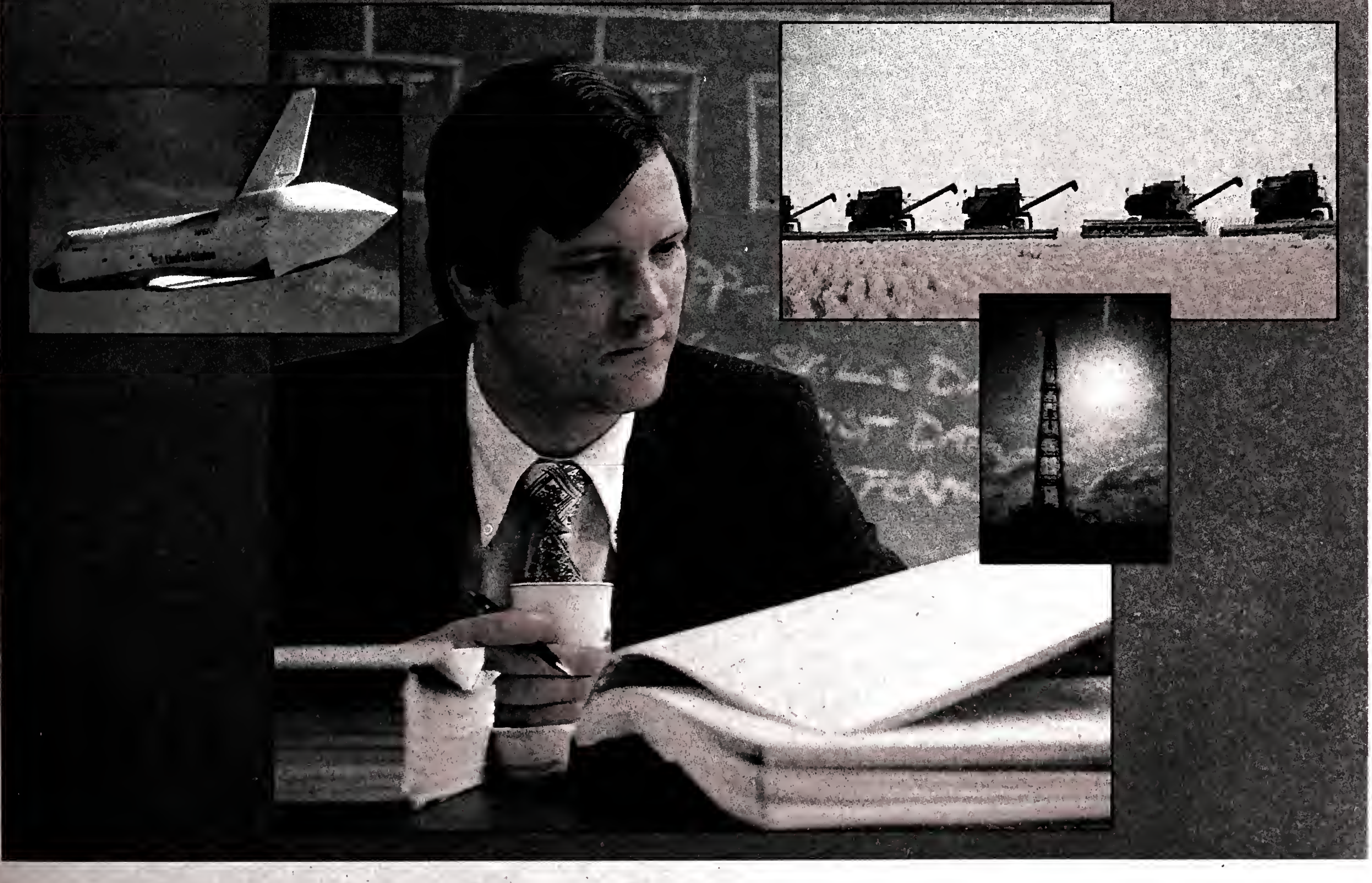

Installed by Utility Company

Debugger Sheds Light on CICS Core Dumps

PEARL RIVER, N.Y. — Programmers at a utility company here managed to escape the nightmare of wading through IBM CICS core dumps to recover programming errors by installing a debugging package.

When Leo Melita, senior systems designer at Orange and Rockland Utilities, Inc., developed an on-line customer service application, he found himself battling the core dumps overpopulating a small CICS testing system in the firm's headquarters. "By the time I waited for the dump to be printed out and searched for the programming error, it might take a full day to solve just one problem," he said. Because much of his time was wasted with this laborious procedure, it took Melita nine months to develop, test and debug 13 CICS transactions.

Melita's project at that time was to convert the manual procedure for handling customers' service requests to an on-line Trouble Order Sub-System. With the new system, Orange and Rockland's customer service representatives would be able to enter the customer's complaint into the CRT terminal directly, ensuring that their repair instructions would be clear and work orders for repairmen not be duplicated.

Such a system would benefit Orange and Rockland's 88,000 gas and 208,000 electric customers throughout its 1,350-square-mile service area, which covers southeastern New York, northern New Jersey and northeastern Pennsylvania.

While Melita developed the Trouble Order Sub-System, he searched for interactive debugging software to replace the CICS testing facility that was running on Orange and Rockland's IBM 370/158. In mid-1980, Melita discovered Intertest, a CICS testing and debugging system from On-Line Software International of River Edge, N.J. He installed Intertest in time for the final testing of the Trouble Order Sub-System and from that point on, eliminated unwanted CICS core dumps.

Using Intertest, Melita is able to monitor a program on-line before it goes into production and with the automatic diagnostic facilities, locate application errors that might violate CICS transactions. "Intertest did prevent the Trouble Order Sub-System from crashing the CICS system," Melita said, "but for me, that was a secondary function.

Biggest Advantage

"The biggest advantage to using Intertest was that I could stop the program with an unconditional breakpoint, check the automatic diagnostic information that appeared on-line to see how the program was proceeding and make whatever changes were necessary."

He added that Intertest also has automatic breakpoints that immediately stopped the Trouble Order Sub-System when an error occurred. The breakpoints were also helpful in locating storage violations, which are difficult to find when paging through core dumps. Melita noted that it once took him three days to find such a storage violation manually, but he hasn't missed one since installing Intertest.

In addition, Melita can use Intertest to find whether a certain field is displayed in a file. By utilizing the on-line file and core transaction commands, he gives immediate answers to users' questions regarding field displays. Adding that the core transaction command is one of the few commands needed to run Intertest, Melita said, "My programming team never received formal training on Intertest other than reading the manual. It's obvious that Intertest is easy to learn since 90% of the Intertest functions we use are confined to just a few commands." When Melita completed the testing of the Trouble Order Sub-System, he applied Intertest to other special projects such as investigating why system tooling during screen changes was moving unusually slow in the morning hours. Other programmers began using Intertest to track existing bugs in other established inquiry systems.

Orange and Rockland continues to use Intertest mostly for the testing of new programs before they enter production. Melita concluded that with the elimination of torturous core dumps, "programmers don't waste time anymore deciding if they want to change coding. With Intertest, coding is easy to put in and change during on-line testing. By relieving the pressures of working with core dumps, Intertest builds a programmer's confidence to change and improve his program during the testing cycle."

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Thanks to Application Developer

On-Line Information System Shreds Red Tape

WASHINGTON, D.C. — How does a government department manage to reduce the stream of red tape and improve its management?

The Office of Administrative Law Judges (OALJ) in the U.S. Department of Labor (DOL) was able to alleviate the continual paper barrage of court-case filings and documentation in two months.

Its technique? The OALJ not only developed and implemented a complete on-line information system for case tracking, but also created a 30,000-case data base.

OALJ gives credit for the success of this project to the Terminal Application Processing System (Taps) from Informatics, Inc. Taps is an on-line applications development tool. It was chosen, according to Lydia Leeds, the OALJ executive officer and program manager, because "Taps is an excellent system that allowed us to put our systems up in very quick time frames," she said.

Taps was chosen after an exhaustive six-month study by Leeds of the numerous software packages available for case tracking control. An extensive requirements analysis was conducted and a consultant was used to determine the most efficient approach for automating the office's unmanageable manual control system.

Nahum Litt, DOL's chief administrative law judge, was the impetus to automate the OALJ's manual case tracking systems. According to Leeds, "He had considerable experience with automation at the Civil Aeronautics Board and knew the kinds of improvements that could result from using computers."

According to Stan Croydon, formerly the lead computer specialist for the OALJ, it was the reputation of Taps as a portable multi environment product that brought the OALJ to look at it initially. Taps operates in various hardware environments, such as IBM; Prime Computer, Inc.; Hewlett-Packard Co.; Perkin-Elmer Corp.; and Digital Equipment Corp., and successfully bridges the gap between mainframes, minis and micros.

Noticeable Impact

Selection of Taps by the OALJ has already had a noticeable impact on operation. Five persons have been removed from the Office Administrative Section and five from the Docket Section. This reduction was accomplished despite an increase in cases from 10,000 in fiscal 1980 to 20,000 in fiscal 1981.

OALJ is much like a law firm, having more than 80 federal administrative law judges located in eight offices in Washington, D.C.; Boston; New Orleans; San Francisco; Charleston, S.C.; Pittsburgh, Pa.; and Cincinnati. These judges head labor-related actions under the Administrative Procedures Act on cases arising from 65 statutes ranging from child labor and equal employment opportunity to longshoremen and black lung compensation.

Three systems were initially identified by the OALJ team, which consisted of Leeds and four others. These systems included Travel, Congressional Correspondence and Case Tracking. The last system was the major concern. Since development of the Case Tracking System, additional systems have been implemented. These include budget control, personnel actions, procurement activities and training. A legal research system is planned for fiscal 1982.

More than 30 fields of information for any case may eventually be entered into the Case Tracking System. This information is added as the case proceeds. Upon arrival of a case file, basic data is entered by a legal technician who starts in motion the assignment of a judge and hearing site.

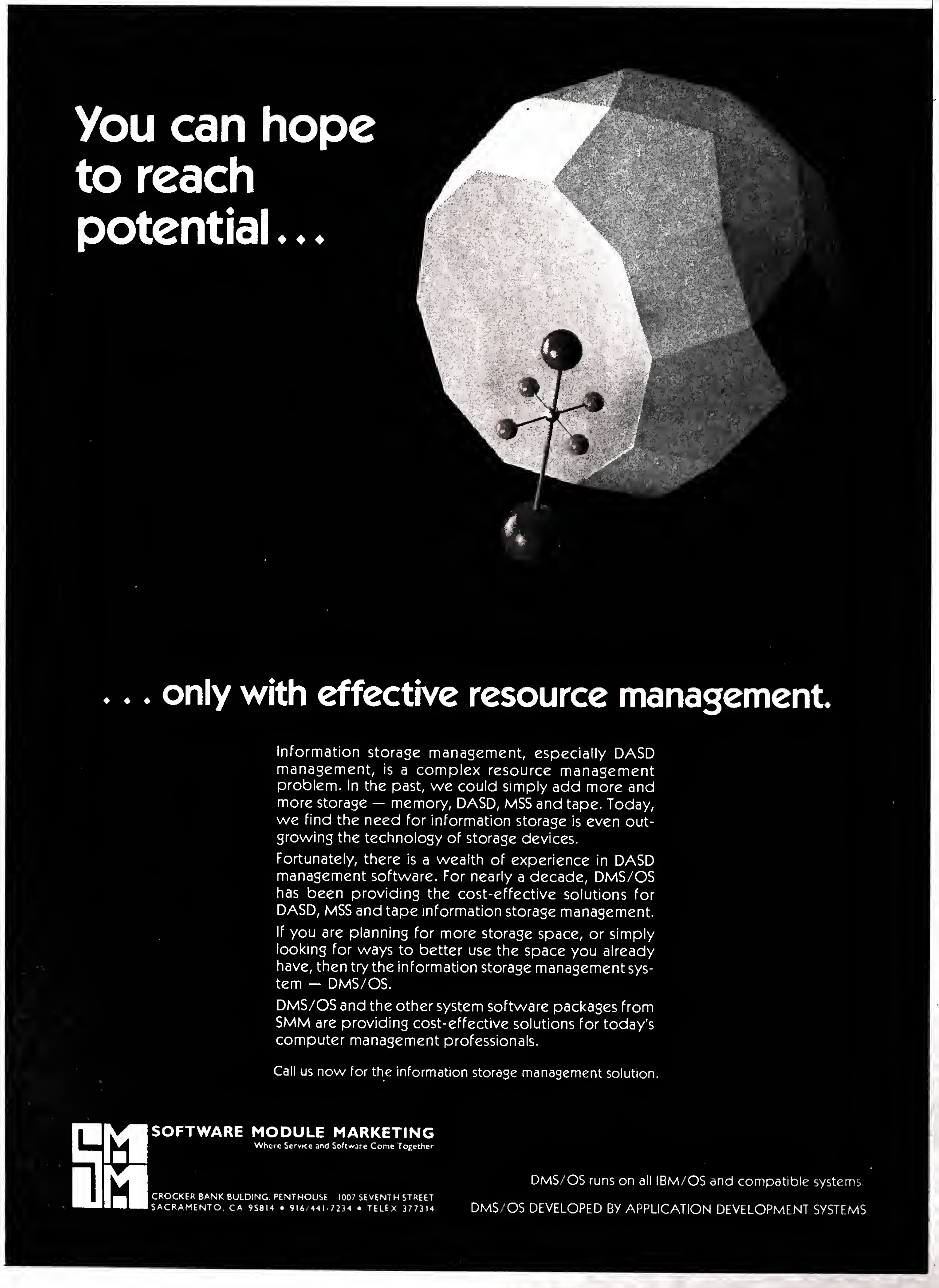
The Case Tracking System was designed to permit this flexible data entry. Numerous data entry variations on the screen can be performed, allowing for skipping any or all of the 30 fields. When adding, modifying or deleting information, the appropriate field is referenced and updated as required.

Efficient Event File

Taps also facilitated the creation of a highly efficient "event" file as part of the Case Tracking System. Anywhere from two to 30 events can be documented as part of a case. OALJ required a system that would save computer storage space for those cases that have fewer than 30 events associated with them. The ability of Taps to mix and match data from separate files greatly aided in this effort.

Croydon explained: "OALJ finds

(Continued on Page 60)



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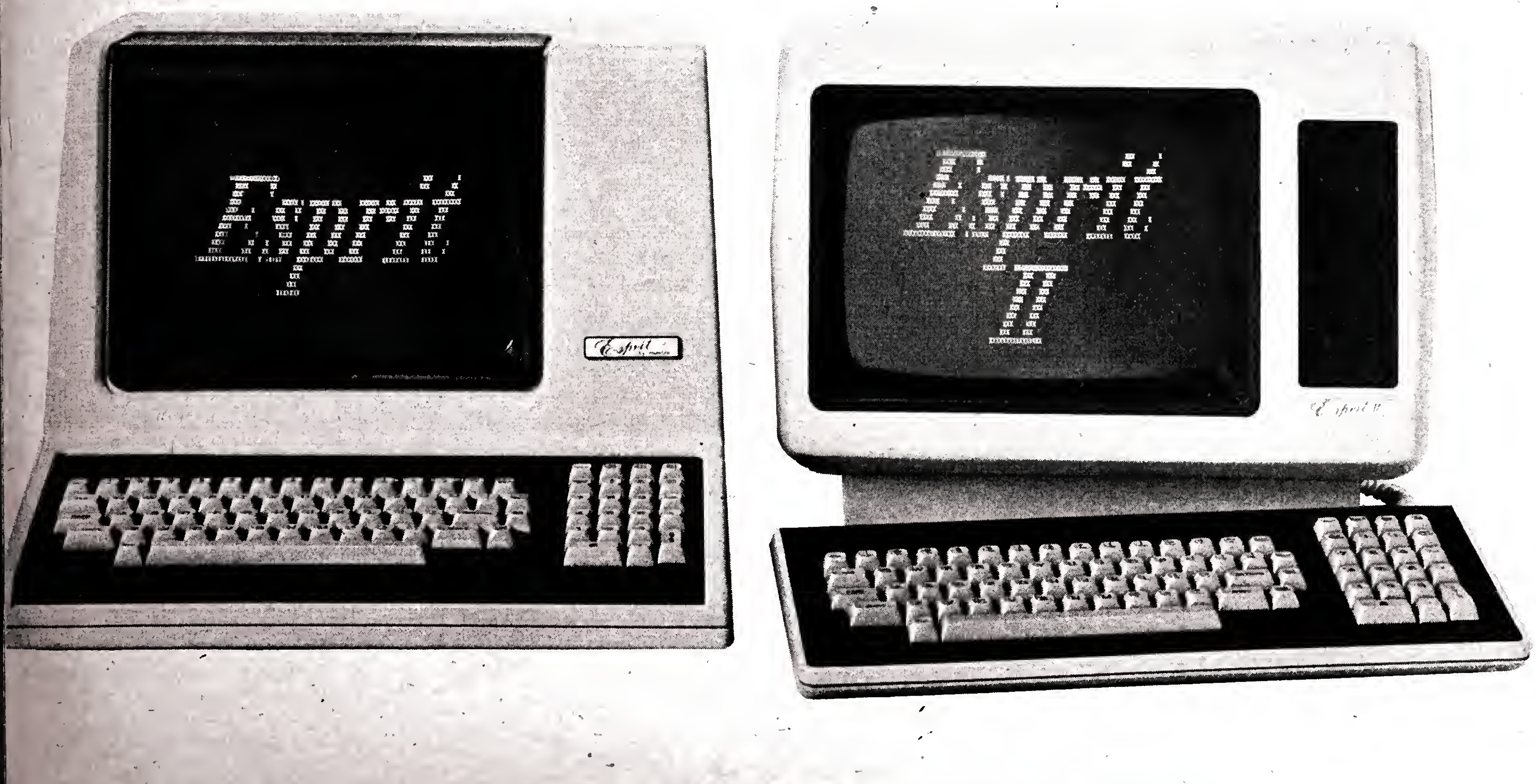

On-Line Package's Flexibility Aids Productivity

COLUMBUS, Ohio — A systems software package has earned high marks from Grange Mutual Co. here for improving programming and operations productivity.

As Bob Walker, computer operations administrator, explained, "Some features of On-line Without Limits [OWL] that have contributed to our productivity gains are its flexibility, [it is] easy to learn how to use, the commands are simple and even abbreviated to one letter [and] conversational Procs [procedures] allow us to create standard procedures for submitting execute runs, thus alleviating the programmer or operator from having to create job control language [JCL]."

OWL is a package marketed by National Computing Industries, Inc.

"The effort that was put forth into the design of the OWL system has made it the easy-to-install, easy-to-use, easy-to-touch, easy-to-control product that it is," Walker maintained.

"In the application programming area, a new user is taught the basic and frequent OWL commands and within the hour is ready to work alone with the system. The new user also has an OWL reference book with all of the commands explained for recall. The various OWL commands can also be displayed on the terminal in a help screen format. All commands may be spelled out or abbreviated to one letter for simplicity."

He described the "command stacking" feature, which enables users to enter any number of consecutive commands to be issued in the desired sequence and only depress the Enter key one time on the terminal.

"The OWL administration function is the responsibility of a system programmer to install the product and set up 'shop standards' and create user profiles of allowable OWL users," Walker continued. "Administration responsibilities also include setting security-level restrictions to each OWL user, coordinating data base backup and restore procedures."

The most powerful flexible feature of OWL from Walker's standpoint is its "conversational Procs." Walker explained that "This is a parameter drives language within OWL that allows you to create JCL standard runs. All a programmer does when running a Proc is answer one question, and the Proc code surrounds the programmers source deck and submits the entire run to the system spooler reader queue.

"The Proc language has only a few commands to select from when writing a Proc, but the flexibility is unlimited," he said, noting that Procs can be used for compiling, assembling, operating system service runs, user JCL needs and on-line program map submissions.

Computer operations can use Procs to set up any JCL for their various batch processing needs, Walker said. "At our company both programming and operations use OWL extensively.

"This product performs a multitude of our data processing needs and requirements," he added.

Agency Shreds Paper Barrage

(Continued from Page 58)

Taps excellent because it enables quick development time on individual applications, allows flexibility in screen design and data base query and can be used in a wide range of computer environments. In fact, when the initial project using Taps was nearing completion, the programmers were also just completing their Taps training."

OALJ, with aid from a time-sharing vendor, took three working days to bring the first system up on an IBM 3033, even though their personnel was unfamiliar with Taps. "Once we started using Taps, it took less than four weeks to develop the first four applications for our Case Tracking System and other administrative functions. Only two weeks later, we had 15,000 case records loaded into the system," Croydon said.

Taps enables the OALJ to tailor screen formats to individual sources of data. According to Leeds, "With Taps, it was very easy to develop and modify screens to suit the needs of users so they could more easily communicate with the computer." Taps also was found to provide quick response time for ad hoc queries of the data base and for the correction of input errors.

"Documenting the steps in DOL cases shows a marked increase," Croydon said. "For every 5,000 cases previously entered on 3- by 5-in. cards in 1979, more than 15,000 cases are now input on the Taps system. Not only does the system file and store information, but it cross-references all codes, establishes trial sites for hearings, tracks cases and documents financial, budgetary and travel expenses."

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here is a common misconception in the data processing industry that the best operating system is built by a hardware company.

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As a result of this conflict of interest, the company is slow to introduce improvements. Often it takes its cue from independent software vendors such as Software Pursuits. In fact, most DOS/VSE enhancements became available only after they were introduced to the industry in MVT/VSE's predecessor, DOS/MVT.*

To compound the problem, the hardware vendor may curtail comparisons with more efficient operating systems by pressuring hardware purchasers into accepting its own software. The net result is the customer's system performance is less than optimal.

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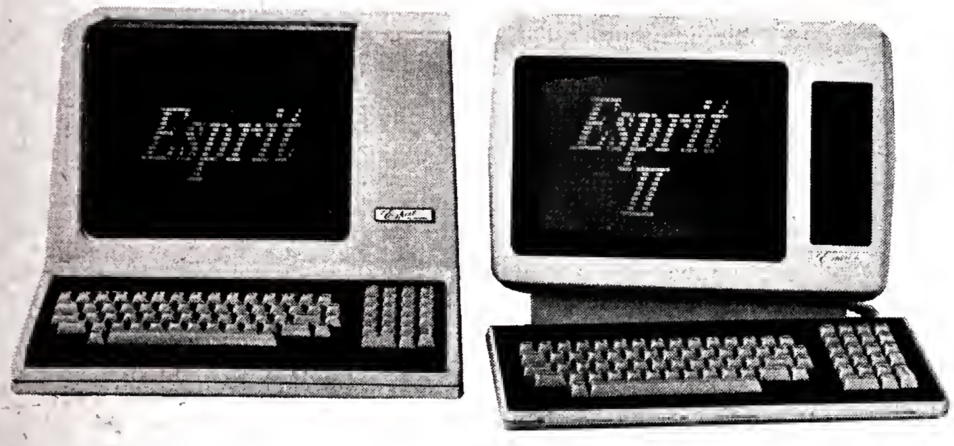

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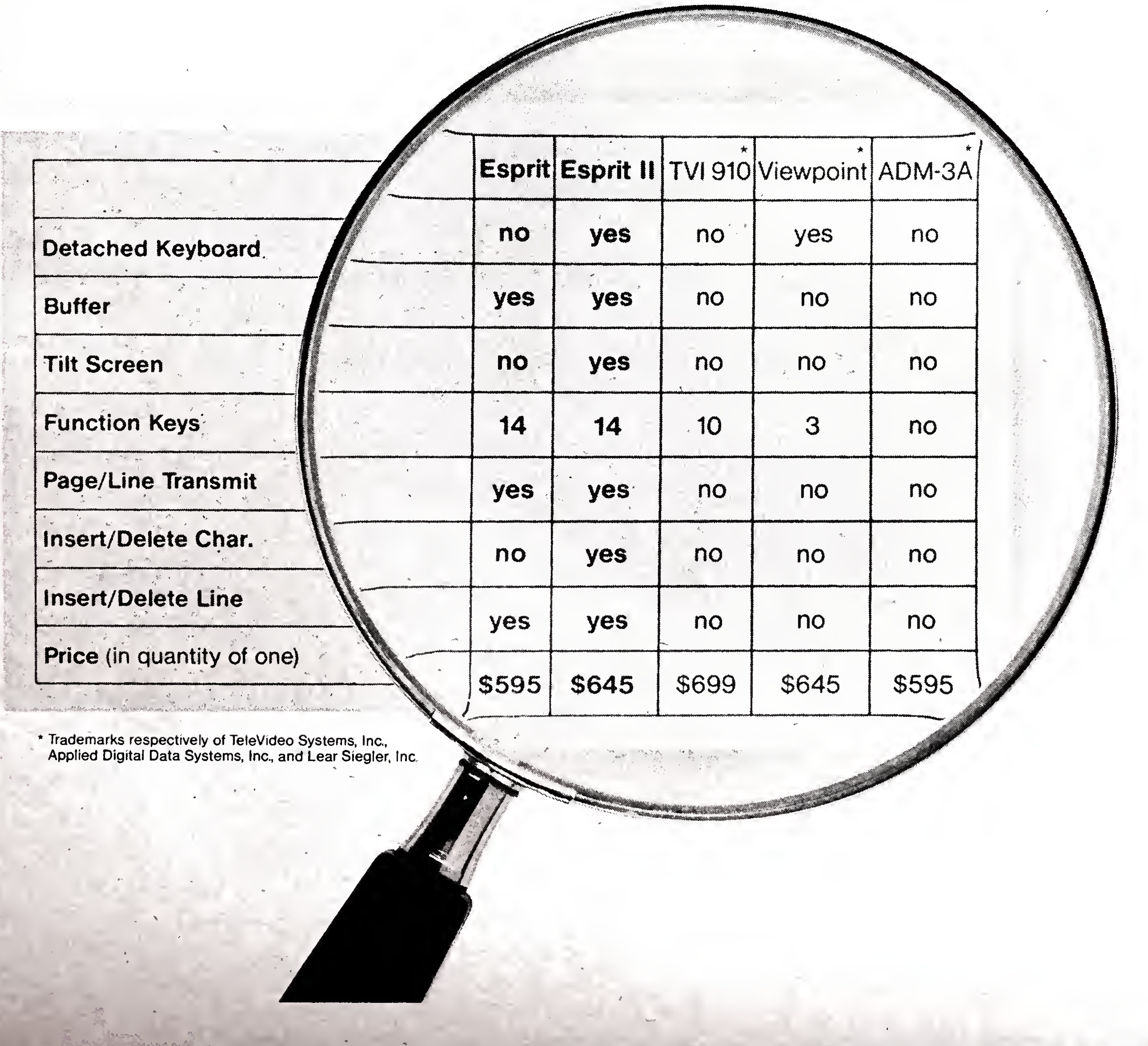

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Tilt Screen	**no**	**yes**	no	no	no
Function Keys	**14**	**14**	10	3	no
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Utility Used to Extend Capabilities of IBM's 'AMS'

AUSTIN, Texas — A utility package is being used by a state agency here to enhance and extend the capabilities of IBM's Access Method Services (AMS) in the backup and recovery areas.

The Texas Education Agency does all of its processing through Remote Job Entry workstations and on-line terminals to an IBM 3032 running under MVS at the North Texas Multi-Region Processing Center in Dallas.

"We use 10 spindles of IBM 3350 disks which are backed up weekly," Steve Ryder, software support group manager, explained. IBM Vsam data occupies about 1⅓ of the spindles. The non-Vsam data are dumped by a proprietary package which does not provide the capability to backup and recover individual Vsam data sets or clusters.

Since September 1979, the agency has used the Vsam-Assist package from Softworks, Inc., Clinton, Md., to backup Vsam data and to provide data set level recovery for Vsam clusters. "The packages complement each other and provide us with a total, integrated backup and recovery mechanism," Ryder said.

Vsam-Assist provides a one-step procedure for copying selected Vsam data sets onto a single (non-Vsam) data set. Data sets to be dumped or restored can be selected by data set name, by generic name, by volume, or by catalog, Ryder explained. The date of last update can also be included in the selection criteria. Also, the dump can be merged with the previous backup, creating an effective archival system for Vsam data sets.

Vsam-Assist features also include a mass delete function, dump and restore facilities for master and user catalogs, multiple copies of the backup tape and the ability to restore Vsam data sets with a primary allocation that reflects the actual data set requirements.

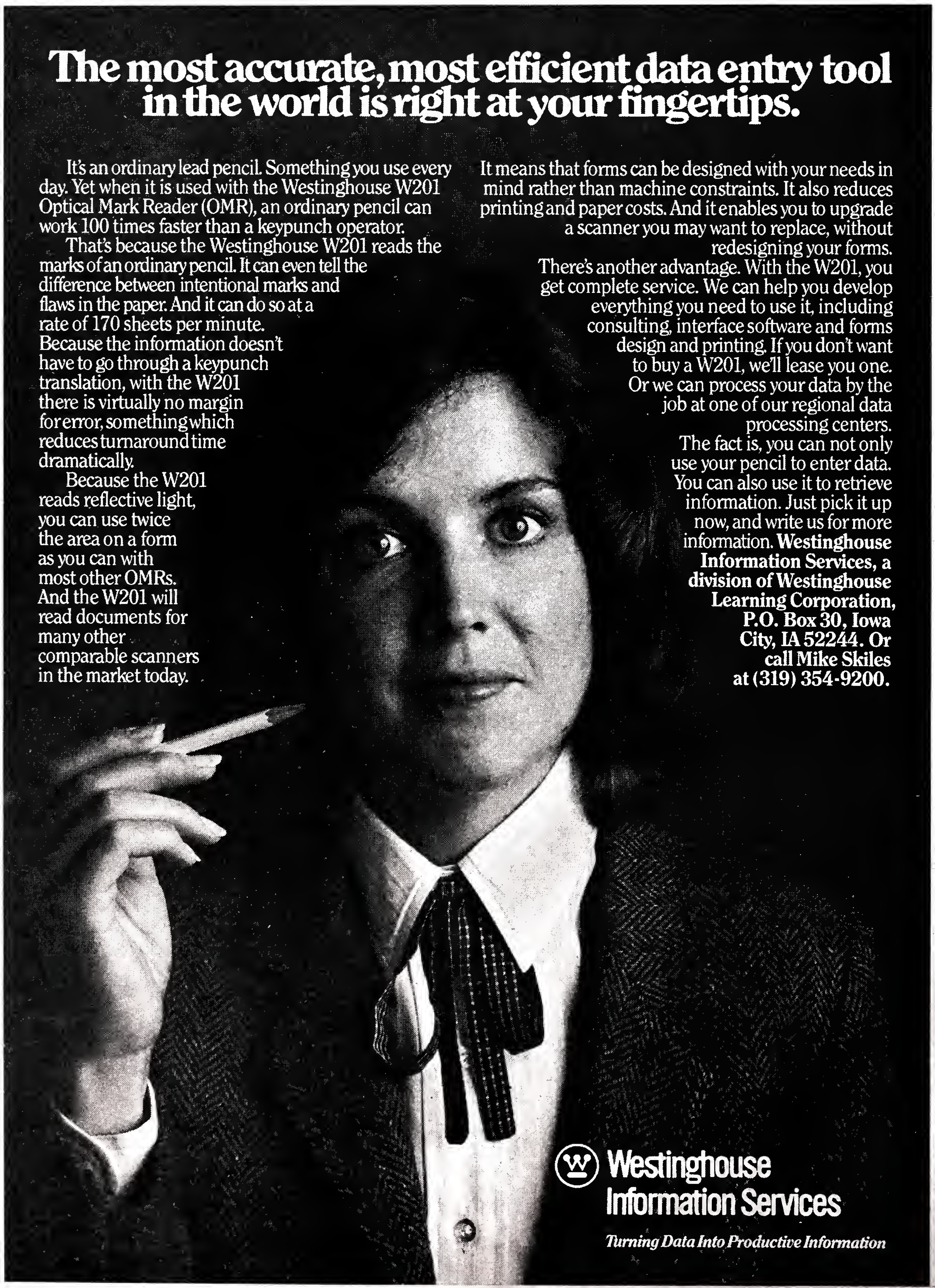
"This feature is useful when migrating to new devices with different track or cylinder capacities. For example, when migrating from 3350 to 3380 disk drives," Ryer said. "The latest release of Vsam-Assist does not depend upon AMS Export function to read Vsam data sets to be dumped, but rather uses its own "Fastpath" access method which accounts for significant performance improvements over previous releases. In dumping a single Vsam data set, Vsam-Assist used less than one-tenth of the elapsed and CPU times required by the AMS Repro utility.

"The really pleasant surprise in the new release is the statistical summary for Vsam data sets which Vsam-Assist provides automatically," he continued. Those statistics include an analysis of free space distribution in the data and index records.

"One statistic relating to sequence set records indicated that we were not achieving expected key compression, consequently, wasting control intervals within each control area," he said. "Another valuable statistic indicates the amount of space allocated versus that actually required. This statistic demonstrated that most of our data sets were grossly under or over allocated.

"Armed with this data, I was motivated to set aside a Saturday morning to reorganize all of the Vsam clusters using some of the 'bells and whistles' which are unique to Vsam-Assist," Ryder explained. "After the reorganization, all of the Agency's Vsam clusters fit comfortably on one 3350 volume. This represented a 30% reduction in disk space usage."

Also, since a mass-delete was done before the reallocation, like clusters (and index and data components) are now physically contiguous, he noted.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Duet Answers Bank's Software Testing Needs

PHILADELPHIA — The main feature of a set of software testing and review procedures used by a major bank here is the combination of a test data generator and logic path analyzer duo.

According to John Peiffer, vice-president and manager of systems development at Girard Bank, Datamacs and Tracmacs from Management and Computer Services (Macs) of Valley Forge, Pa., "have become an essential ingredient of Girard's systems development process now and in the future."

The pair of testing software tools has become the cornerstone of Girard Bank's new approach to its testing needs — Software Testing and Review (Star). Star was designed to build quality assurance into every system and enhances programmer and operational productivity.

Girard is ranked 45th in the nation among commercial banks and fourth in Pennsylvania. Its network consists of 85 full-service offices, 29 sales offices and 45 fully automated offices, and includes the George automated teller machine and George Bank-by-Phone. Girard also has five international offices. Girard's data center operates two IBM 370/168 machines under OS/MVS, JES 3 with TSO.

Based on a study of its DP needs for the future in 1980, Girard created a test coordination unit. The problem areas centered around the need to address a growing work load, to increase user confidence, to reduce production abends and reruns and to provide security of data files. Stan Kalbach, testing project coordinator, was named to head the unit, which concentrated on software testing and instituted the procedure they referred to as Star.

In the process, the test coordination unit undertook the task of evaluating test data generators. Girard listed six points to be considered in selecting a test data generator:

- Ease of use.
- Flexibility while still providing control over data generated.
- Reduce volume of data needed to adequately test software.
- Provide a means of creating IMS test data bases.
- Have a high ratio between coded statements and test records created.
- Provide ability to select and modify test data from existing files as well as create data from scratch.

Based on these requirements, Datamacs got the top evaluation, Kalbach reported.

The need for a test data generator had become evident from problems surfacing in the testing environment. Results of the investigation showed a need for test data that was more varied in content and smaller in volume.

It was also evident that standardized procedures were needed for generating, maintaining and using this data. Turnaround time was becoming a drain on productivity. At the same time, computer and direct-storage access device resources were becoming inadequate.

Being a large, growing bank, Girard had evolved to a situation where different types of testing were handled in different ways. It became evident that standard testing was needed for both consistency and confidence within each group.

With Star, one application coordinator for each of the bank's seven groups generates the test data, runs a set and keeps the output. Whenever test data changes, notice is taken because the changes are readily evident. Moreover, only scratch disk was needed to regenerate test cases, Kalbach said.

Datamacs thus became the featured attraction of Girard's Star procedures. Datamacs as the test data generator has cut down considerably on job time. "For instance," Kalbach said, "a test job which used to take 30 minutes now takes one minute — and you don't have to repeat it." Moreover, testing is done under TSO so that every job step is displayed on the screen. The programmer is no longer dependent on operations for turnaround test data.

When deciding on Datamacs, the Girard evaluation showed that a savings of at least 18% of test time and resources could be realized. The 18% increase in overall productivity of

(Continued on SR/66)

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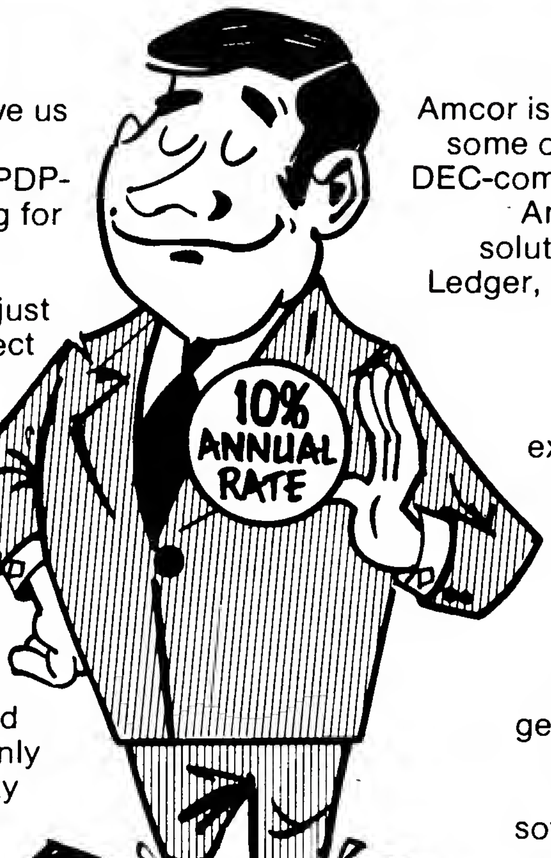

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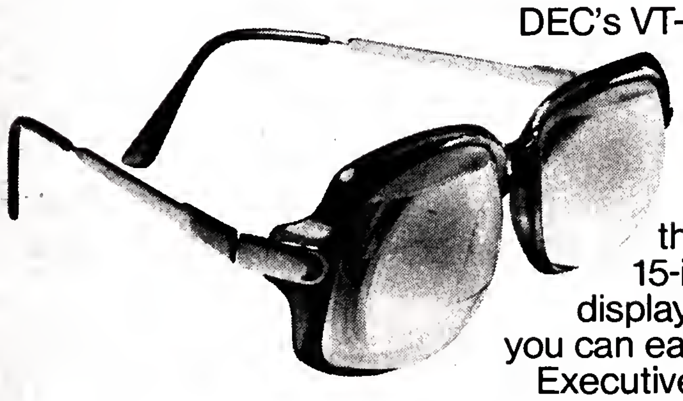

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Package Handles JCL's 'Unforgiving Syntax'

PORTLAND, Maine — "Until now I had resigned myself to the inevitable errors associated with JCL [job control language]. It is a complex and awkward language with an infuriatingly unforgiving syntax."

This was the conclusion of Brian Davis, senior systems analyst in systems services at Union Mutual Life Insurance Co., a major life insurance company located on the coast of Maine.

JCL errors can impact the productivity of the entire data processing organization: operations, programming, maintenance and quality control. Once programmers have gotten their JCL past a cursory SCAN check, they face a number of other potential pitfalls before their program can even begin to execute. This includes data sets only found, missing programs and incompatible Data Control Block parameters.

"These errors," Davis added, "cause the most frustration. Time lost to problems with JCL can equal or exceed that caused by program errors."

Faced with the responsibility of selecting a software package to minimize the effect of JCL problems, Union Mutual chose JCLsafe, a product from Safe Software Systems, Inc. of St. Louis, Mo.

Union Mutual installed JCLsafe on the day before a major new system was to be implemented. A quick introduction was given to the production control documentalist responsible for copying the system into the production libraries. As each job was implemented, production JCL was run through JCLsafe.

Not only did the resulting reports provide useful documentation, they verified that all the library members required were in place, all of the Generation Data Groups had been properly built, all of the overrides were in the correct sequence, any referenced data sets residing on mounted volumes matched the JCL by name and disposition and more. The programmer was able to eliminate JCL errors immediately instead of having to wait until the weekend, when the job would have abended.

The operating environment at Union Mutual is very progressive. The current installation includes an Amdahl Corp. V6, an IBM Model 158 and twin 8M-byte 4341-IIs running under MVS/SP and VM/CMS. An IBM 3081 is due in August.

Duo Answers Bank's Needs

(Continued from SR/64)

programmers meant a savings of more than $9,000 each month. It also meant fewer latent logic errors and more thoroughly tested software products. Based on those figures alone (supplied by the TDG evaluators), the Datamacs purchase price would be returned in three months. Kalbach's evaluation work led him to realize additional features of value to him such as the fact that test files can be created, used and deleted during each test, thus reducing the amount of Dasd space needed for storage. The evaluation team also noted that multiple fields can be created during a single execution of Datamacs. Packed data can be created by a single command.

When Tracmacs, the logic path analyzer, became available as an option to the Datamacs package, Girard realized that the combination could be a powerful tool in handling all the assignments that "were becoming near-impossible to complete."

Tracmacs verifies how much logic is being checked out by providing an audit of the program logic at execution time.

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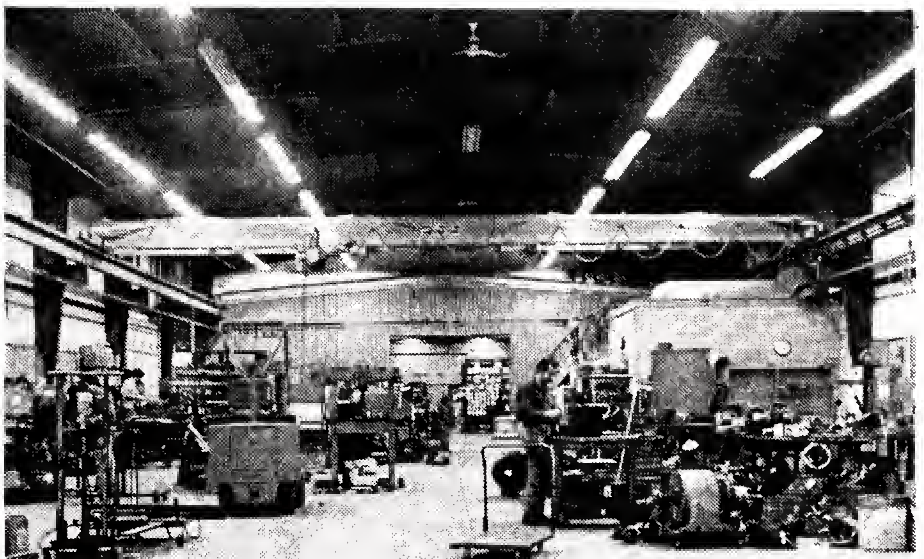
Vital statistics for the multitude of motors that proceed through Hartford/Nutmeg's shop for cleaning, rewrinding, parts replacement and other repair are kept in a minicomputer.



Hartford/Nutmeg's minicomputer is used by several employees for everything from job flow and inventory control to marketing and writing personalized customer invoices.

Repair Shop Tracks Inventory With Mini

BLOOMFIELD, Conn. — Can a computer take a grime-covered, sooty piece of machinery and transform it into a well-oiled engine?

No, but it does make the job a little easier for a firm here that sells and services electrical motors — some of which arrive with one mechanical foot in the grave.

Hartford/Nutmeg Corp. is a family-owned and run organization that was founded in 1911. Its primary business is cleaning, rewinding and repairing used motors, putting them back into service.

To keep track of the various stages of the job flow as well as inventory, accounting and invoicing, the firm uses a Hewlett-Packard Model 250 small business computer.

The computer not only keeps tabs on the cost of labor at each stage of work, but composes custom-tailored invoices, manages a comprehensive filing system and maintains a sales list, according to Richard Persky, a principle with the firm.

The company first turned to computing in 1978 when Sidney Lebowitz, son of the company's founder, bought and assembled a microcomputer kit to indoctrinate the firm into data processing. The kit cost about $10,000. Persky, then an insurance executive, wrote the software.

However, the pace of the business soon outran the micro's capability and the firm opted for the HP machine.

Presently, the HP 250 has 192K bytes of memory, a built-in and a remote Model 26089A terminal, a 180 char./sec printer, 20M bytes of hard-disk storage space and a 1.2M-byte floppy disk drive.

"We wanted to build a fairly sophisticated corporate data base for management reporting, job flow, accounting and other functions that couldn't be handled on the old system," Persky explained.

The company was willing to invest about $50,000 for a new computer — roughly five times the money laid out for the microcomputer kit. Several people at Hartford/Nutmeg can use the HP 250 at the same time — either working at the firm's remote terminal or at the central console. The company eventually plans to add terminals to its front office, the shop tool and parts crib and the administrative assistant's office, Persky noted.

The main benefit of the system is that it keeps a sharp eye on inventory and stock, he pointed out. "We can check the physical location of our stock against the computer listing to get an accurate picture of our current status. In the past, taking a physical inventory was impossible; we'd simply make a guess and hope the stuff was there," Persky observed.

In the future, the firm plans to add engineering calculations to the computer's repertoire — eliminating tedious hand computations — and expand its use into marketing and management. It might also use it in a direct mail campaign that would use the computer to spotlight customers according to past purchases, location and credit status, he said.

Which Road To Hardware?

Robert Frost, the famous American poet, once extolled the virtues of selecting a less traveled route over a more well-worn path. Walking down that less favorable road, he said, "has made all the difference."

Unfortunately, one does not need a poetic license to know that taking a "less traveled" route in selecting computers — especially minicomputers and small business systems — can be disasterous. Users that buy systems from a new vendor without investigating the alternatives can soon find themselves at a technological dead end.

And the situation can be just as disasterous for users that purchase equipment from well-known vendors but go by selection criteria that are one step above flipping a coin.

So how does one know which road to take toward a hardware acquisition? In August, *Computerworld* will offer a Special Report on minicomputers and small business systems that not only will be a road map for the uninitiated, but also a guidebook for those that dare to venture beyond the request for proposal.

If you are a user who has traveled the acquisitions route — and has the road dust to prove it — or if you would like to plant a signpost warning others of potholes in the road, CW would like to hear about your experiences.

Contributors are requested to send articles (about six or seven typewritten, double-spaced pages in length) to Senior Editor Tim Scannell here at *Computerworld*, P.O. Box 880, Framingham, Mass. 01701. Pictures and other graphics are welcome.

Digidyne Introduces Family Of Subsystems for DG's Nova

SAN DIEGO — Digidyne Corp. has introduced a family of plug-compatible peripheral subsystems for users of Data General Corp.'s Nova minicomputers. The subsystem family consists of six members, all based on Digidyne's single-board controllers and peripherals. They are:

- VDS 2001 Video Display Subsystem, which supports up to eight Dasher D-200-equivalent video display terminals with Digidyne's D-2001 Multi-I/O controller. A basic VDS-2001 subsystem costs $1,250.
- CPS 2001 Character Printer Subsystem, which handles up to eight 125 char./sec dot matrix or 25 char./sec daisywheel printers using a D-2001 controller. A basic system costs $3,675 for dot matrix and $5,825 for daisywheel versions.
- LPS 2001 Line Printer Systems, which combines a 300 or 600 line/min matrix line printer with the D-2001 controller. Prices for this combination begin at $8,825, according to the vendor.
- CDS 3001 Cartridge Disk Subsystem, which accommodates up to four 10M-byte drives using the company's D-3001 controller. A single-drive version costs $4,495.
- SMS 6001 Storage Module Subsystem, which allows users to choose up to four 80- or 300M-byte storage module drives or 32- or 64M-byte cartridge disk drives with its D-6001 microprocessor-based controller. An 80M-byte single-drive SMS 6001 subsystem cost $12,700, and a single-drive 32M-byte version costs $9,900.
- SMS 5001 Magnetic Tape Subsystem, which offers backup facilities of up to eight 12.5- to 125 in./sec vacuum tape drives in combination with the Digidyne D-5001 formatter/controller. A single-drive 75 in./sec dual-density 800- to 1,600 bit/in. subsystem is priced at $10,925.

Further details on these products can be obtained from Digidyne at 2625 Ariane Drive., San Diego, Calif. 92117.

Ibex 7500 System Out From Martec

WELLESLEY, Mass. — Martec International Electronics Corp. has introduced a multiprocessor microcomputer system that offers Digital Research, Inc. CP/M and MP/M compatibility. The Martec Ibex 7500 uses multiprocessor architecture to link up to eight independent computers through a common data base without degradation of response time, the vendor said.

The system comes with built-in memory parity protection, keyboard buffering, battery operated real-time clock/calendar interrupt and RS-232C interface.

The Ibex 7500 costs $11,770 from Martec, 20 William St., Wellesley, Mass. 02181.

Memory Board Fits Wang 2200s

RALEIGH, N.C. — Southern Data Systems, Inc. has developed a plug-compatible 128K memory board for the Wang Laboratories, Inc. 2200 Series SVP, LVP and MVP computer systems.

The SM-1 can be used in addition to or in place of the Wang data memory boards and is reportedly compatible with Wang's LVPC and MVPC systems that allow expansion of data memory to 512K.

The $1,200 price includes a one-year warranty, with maintenance after that year priced at $180 annually. Southern Data Systems is at 5109 Holly Ridge Road, Raleigh, N.C. 27622.

Software, Plexus Mini Form Decision Support Machine

SAN JOSE, Calif. — EPS, Inc. is offering financial planning software that, when combined with a Plexus Corp. P/40 minicomputer, forms what the vendor calls a Decision Support Machine.

The Unix-compatible system offers financial modeling, "what-if" scenarios, prewritten functions and routines, simultaneous equation solution, nonprocedural statements, text manipulation, indirect addressing of variables, data management, forecasting, editing and advanced programming capabilities using the FCS-EPS language.

FCS-EPS also provides various prewritten functions for lead and lag of payments/receipts, rounding, column calculations, percentages and summaries.

The introductory price for the Unix-compatible FCS-EPS software is $5,000. Prices for the Decision Support Machines utilizing supermicros and the Unix-compatible software begin at $25,000, EPS said from 1788 Technology Drive, San Jose, Calif. 95110.

Intellimac Announces 16/32 Bit Unit

ROCKVILLE, Md. — Intellimac, Inc. has announced a 16/32-bit single-board stand-alone computer.

The 68 Magnum is said to combine the Motorola, Inc. 68000 CPU (6-MHz version) with 128K bytes of 200 nsec random-access memory. The board features 16K bytes of operating system erasable programmable read-only memory (Eprom), 16K bytes of user Eprom, two RS-232 serial ports with selectable data rates and a Centronics Data Computer Corp.-compatible parallel port.

Also featured are reset and abort function switches. By adding a power supply, a terminal and an off-line storage device, the user can create a 16/32-bit computing system.

Priced at $895, the board includes RS-232 interface cable and a 100-page manual. Intellimac is on the Sixth Floor, 6001 Montrose Road, Rockville, Md. 20852.

NSC RAM Card DEC-Compatible

SANTA CLARA, Calif. — National Semiconductor Corp. has introduced the NS23R, a 1M-byte random-access memory (RAM) card that it said is compatible with the Digital Equipment Corp. PDP-11/03 and PDP-11/23 minicomputers and the LSI-11 microcomputer.

The memory card uses 64K dynamic N-channel MOS random-access measurement system and can be configured from 64K by 18 bits to 512K by 18 bits.

The NS23R is priced at $3,925 for each 1M-byte board and $2,665 for each 512K-byte board. National Semiconductor Corp. is at 2000 Semiconductor Drive, Santa Clara, Calif. 95051.

Card Reader Debuts For Series/1, PDP-11

FRAZER, Pa. — Cardmation Co. has announced the CR600/92, a card reader for IBM's Series/1 and Digital Equipment Corp.'s PDP-11 processors.

The CR600/92 is a 600 line/min punched card reader with an RS-232C buffered serial interface. The unit can communicate via telephone lines to processors with asychronous RS-232C ports, the vendor said.

The unit costs $5,400. Cardmation is at P.O. Box 746, Frazer, Pa. 19355.

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OA Technology — Part 3

Voice Mail Making Itself Heard in OA

This is the third in a series of articles reviewing various office automation technologies. This week, a look at electronic voice store-and-forward systems, also known as voice mail. In the July 5 issue, text retrieval systems.

By Bruce Hoard
CW Staff

CAMBRIDGE, Mass. — The installed base is small and the number of vendors much smaller, but electronic voice store-and-forward systems are breaking into the office.

Also known as voice mail, this recent addition to the burgeoning automated office is now implemented at some 100 companies. Two of the three dominant voice mail vendors are household names in the computer industry — IBM and Wang Laboratories, Inc. The third company, ECS Telecommunications, Inc., was a pioneer in the field, according to Dave Mack, director of consulting with the Yankee Group here.

A typical voice mail system records messages, converts them into a digital format and stores them in an audio "mailbox" for subsequent access by one or up to 2,000 users. Other features include save, file and delete, he said.

Users may also purchase a forced delivery option that will not quit until the recipient's mailbox is found. In addition, users may send a single message to a multitude of destinations simultaneously. The average available message space runs from less than a minute to 10 minutes with unlimited dictation space optional.

The requisite hardware consists of a

(Continued on Page 62)

Manager Gives Voice Mail an '8'

WILMINGTON, Del. — Peter Derosier gives the electronic voice store-and-forward system at Hercules, Inc. an eight on a scale of 10.

Installed in November 1980, the ECS Telecommunications, Inc. Model 64 cost $500,000. It serves more than 1,800 users "and they love it," the Hercules manager of telecommunications said in a recent interview. Derosier is happy because the ECS voice mail system has reduced "telephone tag," cut communications response time and saved money.

The Model 64 is used heavily by Hercules' marketing and operations departments. Marketing representatives have eliminated the frustration of remote telephone communications and operations personnel have a better idea of what is going on at dispersed locations since they hooked up with voice mail. "It gives them the opportunity to stay in touch," Derosier said, adding that one remote site claims it has reduced its long-distance toll-call bill by 40%.

The most common voice mail application? "That's a little difficult to tell. I can give you the volume of the U.S. mail, but I don't know what's inside those envelopes."

Derosier did say, however, that the average user accesses the system three times daily.

The telecommunications manager reported some hardware and software bugs during implementation, but there have been no ongoing problems.

If he likes the system so well, why didn't Derosier give it a 10? "Ain't nothing perfect," he declared.

Videotex Package Links IBM Micro With Series/1

RYE, N.Y. — IBM has unveiled videotex software that links its Personal Computers with Series/1 processors and provides text and graphics information over standard telephone lines.

SVS/1 can be used to transmit internal mail, budgets, sales and merchandising information, travel schedules and bulletin-board notices. Up to 24 concurrent videotex callers may be supported along with larger numbers of intermittent callers, IBM said.

Because the licensed program product operates under a Series/1 Event Driven Executive, a general-purpose operating system, it can run along side other Series/1 applications.

Through user-written application pro-

(Continued on Page 63)

NCR Unveils New Model Of Worksaver

DAYTON, Ohio — NCR Corp. has unveiled a new model of its Worksaver word processing system, new software for the Wordsaver and a series of modular administrative and teller service stations.

The WS-140 can function as a standalone system, cluster workstation or a master station in either a dedicated word processing environment or a departmental management information system. Its desktop unit contains a tilt and swivel 15-in., high-resolution screen capable of displaying 28 lines, each 80 characters long.

There is also a functional copy holder that houses a 16-bit microprocessor with 256K, 384K or 512K bytes of memory. Oth-

(Continued on Page 63)

DEC Brings Out Enhanced Version Of Electronic Mail

MAYNARD, Mass. — Digital Equipment Corp. introduced All-In-1 as part of its Office Plus product set, an enhanced version of its Decmail electronic mail package and a laser printer.

All-In-1 features single terminal access to a comprehensive set of office-related functions through an easy-to-use menu, DEC said. The menu gives users an integrated set of programs and provides immediate access of all of the system's capabilities.

In addition to standard text and data processing, the menu contains other features such as Decmail, desk calculator, on-line

(Continued on Page 66)

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Voice Mail Making Itself Heard in the Office

(Continued from Page 59)

minicomputer, between 275M bytes and 2G bytes of hard-disk storage, telephone line interface units and a voice compression algorithm for digitizing the message, Mack explained.

Currently, only Touch-Tone telephones may be used, although several manufacturers are working on systems that will accept the traditional pulse dialing telephones.

The First Step

The first step in digitizing a voice is breaking it down into tiny particles. "In order to get telephone-quality voice, the minimum acceptable post code modulation sample rate — which is used as a standard by the Bell system — is 64,000 samples per second," Mack observed, noting that samples cannot be called "bits" until later in the process.

What the compression algorithm typically does is eliminate about 50% of the samples because only 50% are needed to construct high-quality voice, he explained.

Some experimentation is being done on analog voice mail, a technology that is presently hampered by long response times in retrieving data from magnetic tape. "When you call for your message, you don't want machines spooling through a lot of tape, trying to find your message," Mack pointed out.

For Affluent Users

With a price tag of up to $500,000, voice mail systems are only affordable to affluent users who may find it difficult to cost justify their purchases, the consultant commented. He said that the principle benefits to be had are the elimination of "telephone tag" and "dramatically improved" communications.

For instance, sales representatives on the road who have been frustrated by busy signals from public telephones can now get their messages through, he said, adding the voice mail "time-shift" capability lets users send and receive intertime zone, nationwide messages no matter what the time of day.

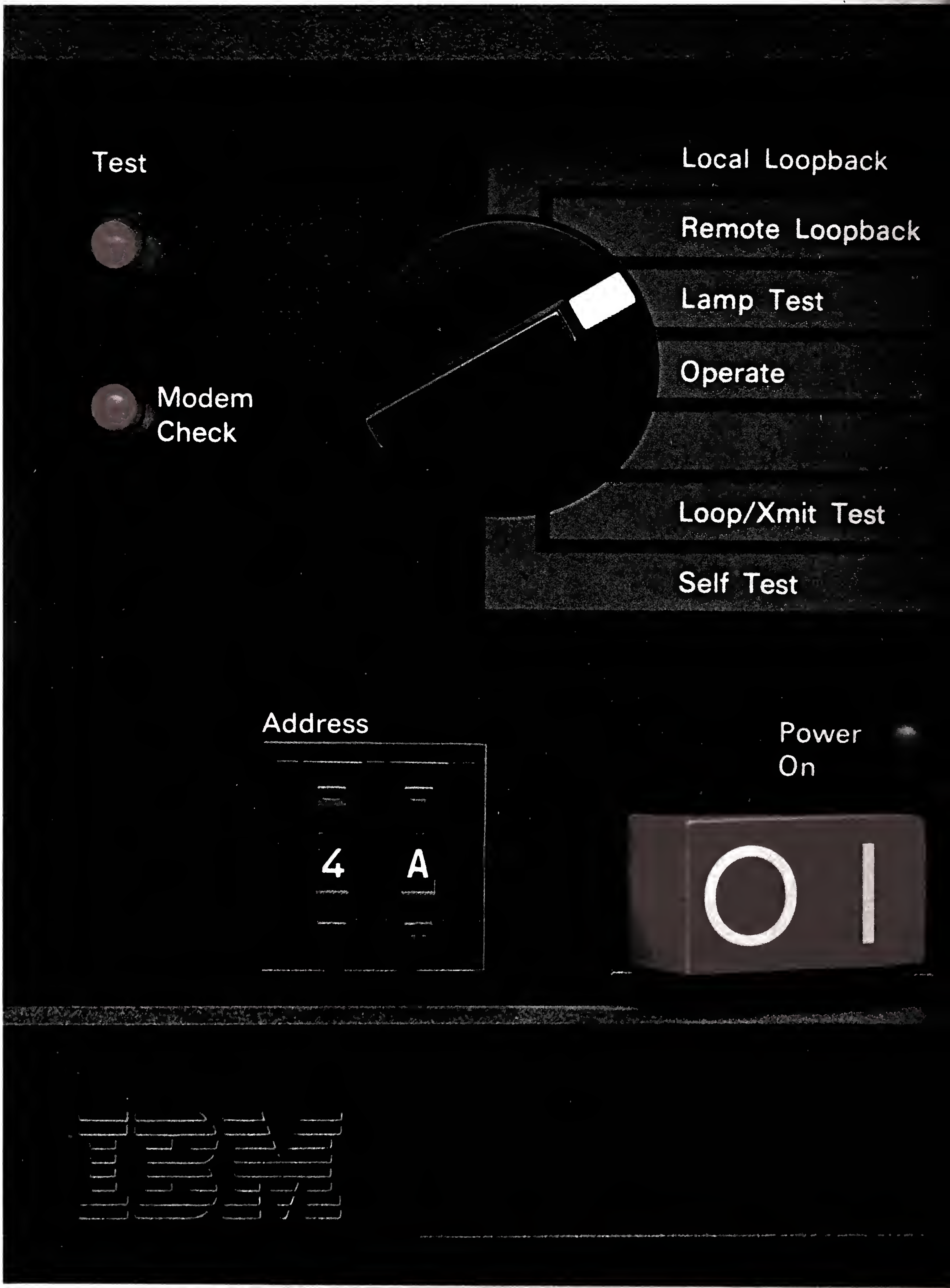
Another plus is the ability to upgrade to such services as electronic mail. "You have the disk space, you have the minicomputer, you have the telephone lines and you have all the addressing and file functions of the software already built in," he said. "The only thing you bypass is the compression algorithm."

On the debit side, usable public telephones must have Touch-Tone dialing, or the caller must have an attachable Touch-Tone decoder. Even then, some public telephones lock out the Touch-Tone decoder as soon as a connection is achieved, Mack declared.

Vendor support has lagged in the past and will be critically important over the next three or four years because some systems are too complex for many users, he explained

As far as the future is concerned, Mack predicted that the next five years will see voice mail being integrated with other communications technologies such as electronic mail and facsimile.

He thinks it will be three to five years before compression algorithm ratios increase from the current 2:1 to 4:1, 5:1 or even 6:1.



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Videotex Software Links IBM Micro, Series/1

(Continued from Page 59)

grams, SVS/1 can access other Series/1 or host computer applications. For example, order entry information could be passed between the software and another Series/1 program to update accounts receivable records and generate invoices.

SVS/1 uses an alphamosaic pattern to create videotex images. In this process, graphics images are made up of a "mosaic" of small rectangular elements.

A spokesman said only a few commands must be learned in order to operate the system, which can store up to nearly 350,000 screens or "frames" of information. Each frame consists of 24 rows and up to 40 characters of information per row. The frames can be created, stored, edited and updated at designated editing terminals.

Videotex data bases can contain many forms of business information, ranging from product summaries and operating procedures to presentations, directories and catalogs. Information is displayed in a videotex format, usually combining text and graphics and up to eight colors.

Users can select and view a category of information from menu screens — or may designate a specific frame number — by entering simple commands on a numeric keypad or alphanumeric keyboard using a combination of digits and symbols.

SVS/1 will be available this December and the one-time license fee is $10,000, IBM said.

NCR Enhances its WP

(Continued from Page 59)

er features include a 5¼-in., double-sided, dual-density, flexible diskette drive and a 5¼-in., 5M-byte sealed, Winchester drive. A keyboard, featuring a standard typewriter key configuration, function keys and a 10-key pad attaches to the unit.

Prices range between $9,895 and $25,000 for a four-station configuration.

The Multiplan software package for the Worksaver series can be used for forecasting business trends, capital management and a host of "what if" situations.

The program can divide the workstation's screen into six "windows" allowing the user simultaneous access to several documents or information records. It is capable of five-function math including addition, subtraction, multiplication, division and percentages.

It costs $100 on a yearly basis or $250 for a one-time license fee.

The Branch Automation System BAS 5000 reportedly allows users to create cost-effective and application specific workstations by combining modular display screens, keyboards and printers in a variety of ways.

Modular components introduced include a branch processor; two workstation controllers; three screen-based displays; three keyboards; three printers; a personal identification number keypad; and magnetic strip card reader.

The company also released its Transaction Management Executive operating software and programming development aids.

BAS 5000 prices vary according to the modular units and software programs utilized in creating various workstations. An administrative workstation would typically include a 12-in. CRT screen, 111-key alphanumeric keyboard and a letter quality printer and costs $5,700, NCR said from Dayton, Ohio 453479.

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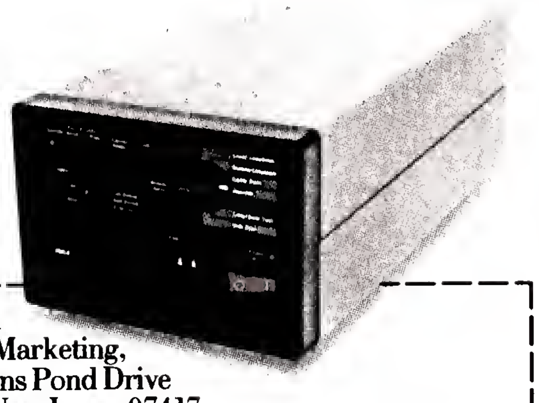

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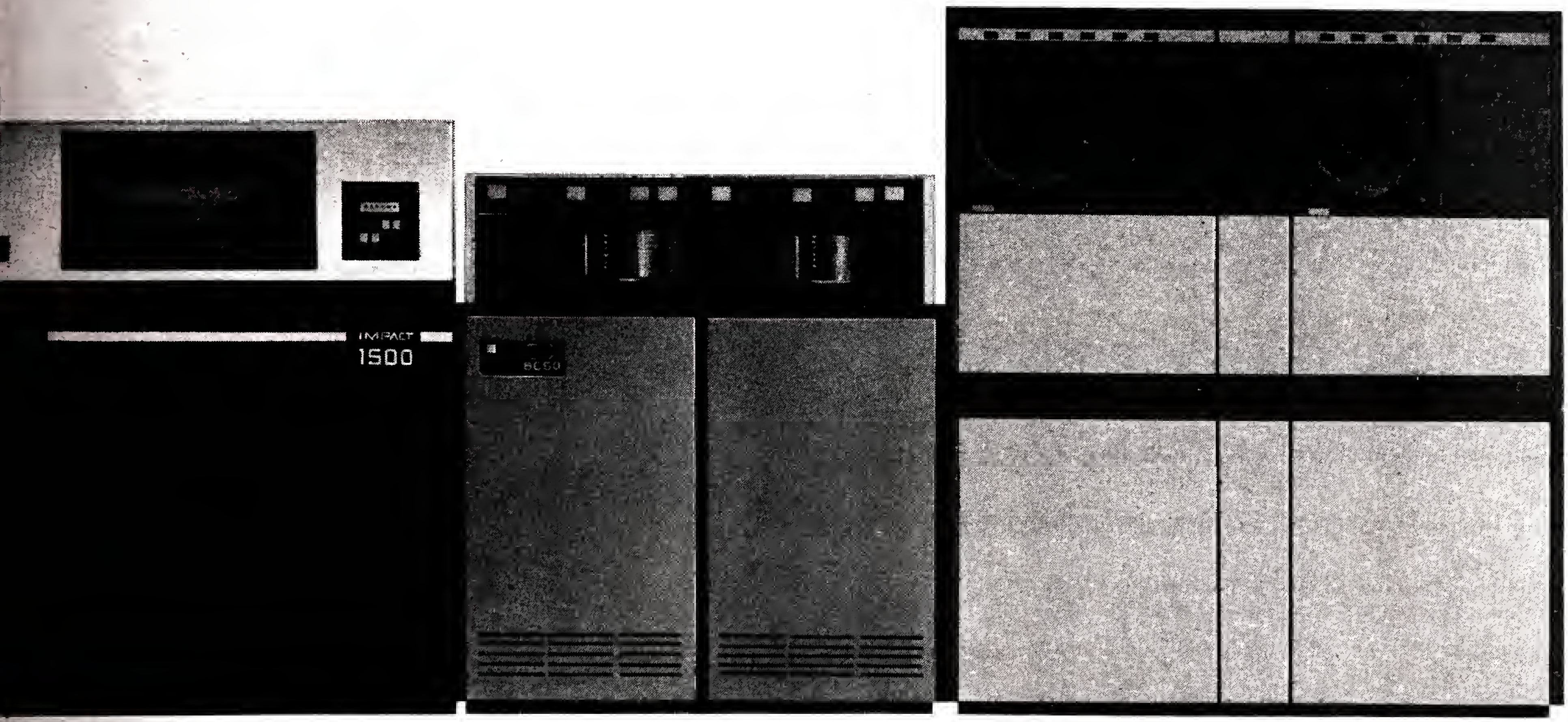

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DEC Offers Update for Electronic Mail

(Continued from Page 57)

phone directory, calendar management, action item listing and an electronic filing cabinet.

All-In-1 is being offered in two configurations, Basic and Extended. The Basic package is said to give first-time users a comprehensive office system that allows for future growth. The product can be configured on all of DEC's VAX computers.

The Extended version is for more advanced needs ands offers all the advanced needs and offers all the well as additional data management and application development capabilities. It lets users customize the system to conform to their office automation requirements. Features include VAX-11 Datatrieve, common data dictionary, spelling dictionary and programming capability in higher level languages such as Basic and Cobol.

The system can be accessed by DEC's VT100 terminals or any member of its personal computer family.

The base price for All-In-1 Basic, including a fully configured VAX-11/730 system, is $93,000. As a layered software package, All-In-1 begins at $47,900.

DEC also introduced Decmail V2.0, which is said to add a multinode capability with enhanced word processing, electronic mail and computer-based instruction features.

Multinode messages between Decmail users and VAX/VMS are sent via Decnet. With this option, users can create, edit and send messages to individuals by name and location, or to an entire distribution list at multiple locations.

Decmail V2.0 supports document transmission from Decmate, Decword/DP and other DEC word procesors. Documents created on word procesors and sent by document transmission retain all special control characters, such as rulers, underlining, bolding and embedded codes.

The product is available immediately and costs $20,000, DEC said.

The LN01 prints approximately 12 standard size (8½- by 11-in.) pages per minute and will be available for the vendor's Unibus PDP-11 and VAX systems. It will cost in the $20,000 range and be available in the spring of 1983, DEC said from Maynard, Mass. 01754.

Correction

The "Calendar" section of *Computerworld OA* [June 23] carries the wrong address and vendor for several listings. The following list contains the correct vendor and address:

June 28-29, Denver — **Data Communications: Advanced Concepts and Systems.** Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

June 28-30, San Francisco — **Planning for Office Automation: Concepts and Practices.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

June 28-30, New York — **Integration of Word Processing and Data Processing Systems.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

July 12-14, San Francisco — **Word Processing: Effective Operations Management.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

July 14-16, Los Angeles — **The Supervisor's WP/Office Automation Workshop.** Contact: Linda Megill, Office Automation Seminars, P.O. Box 153, Springfield, Va. 22150.

July 16, Los Angeles — **Management's Use of Computer Graphics for Improved Productivity and Sharper Decision Making.** Contact: Joan Merrick, Datamation Institute Coordination Office, Suite 415, 850 Boylston St., Chestnut Hill, Mass. 02167.

July 22-23, Cambridge, Mass. — **Integrating Word Processing and Data Processing: Technology, Architecture, Planning.** Contact:
Joan Merrick, Datamation Institute Coordination Office, Suite 415, 850 Boylston St., Chestnut Hill, Mass. 02167.

July 26, Chicago — **Business Graphics.** Contact: Joan Merrick, Datamation Institute Coordination Office, Suite 415, 850 Boylston St., Chestnut Hill, Mass. 02167.

Aug. 9, New York — **Business Graphics.** Contact: Joan Merrick, Datamation Institute Coordination Office, Suite 415, 850 Boylston St., Chestnut Hill, Mass. 02167.

Aug. 13, Philadelphia — **Electronic Communications: Mail, Message, Data.** Contact: Joan Merrick, Datamation Institute Coordination Office, Suite 415, 850 Boylston St., Chestnut Hill, Mass. 02167.

Aug. 16, Chicago — **Management's Use of Computer Graphics for Improved Productivity and Sharper Decision Making.** Contact: Joan Merrick, Datamation Institute Coordination Office, Suite 415, 850 Boylston St., Chestnut Hill, Mass. 02167.

Sept. 13, Cambridge, Mass. — **Business Graphics.** Contact: Joan Merrick, Datamation Institute Coordination Office, Suite 415, 850 Boylston St., Chestnut Hill, Mass. 02167.

Sept. 16-17, San Francisco — **Strategic Planning for Office Automation: Current Realities, Organization, Guidelines for Implementation.** Contact: Joan Merrick, Datamation Institute Coordination Office, Suite 415, 850 Boylston St., Chestnut Hill, Mass. 02167.

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Cbema Sounds Call For Participation In Data Flow Debate

By Jake Kirchner
CW Washington Bureau

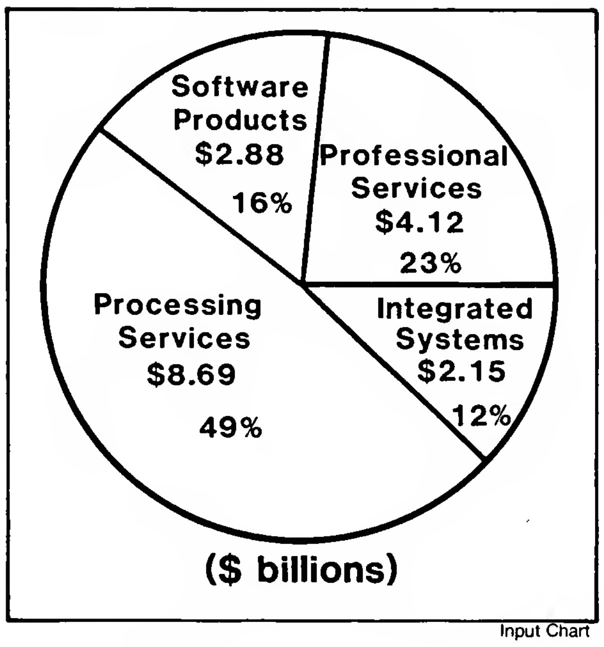
WASHINGTON, D.C. — The major U.S. computer makers, through the Computer and Business Equipment Manufacturers Association (Cbema), are calling for increased American industry and government participation in the growing international information flow debate.

A Cbema white paper on information flow, scheduled for release early next month, said all governments should be flexible when considering data flow issues. At home, the association suggested, U.S. industry must work more closely with the federal government "to develop a more coordinated approach to information policy."

In a general statement of the Cbema position on information flow, the paper said: "Information should be allowed to flow within and across national borders without constraint and without regard to the format or medium of exchange, limited only to the extent internationally accepted as necessary to protect individual privacy, national security and the proprietary rights of individuals and business enterprises."

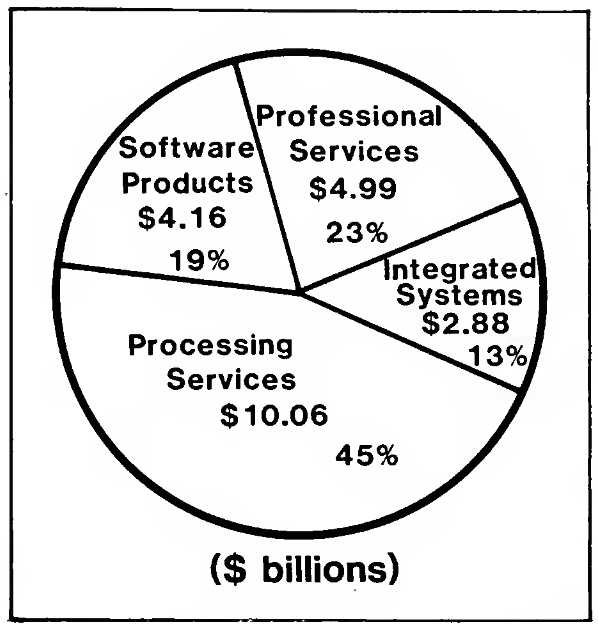
Cbema has endorsed the privacy guidelines developed by the Organization for Economic Cooperation and Development, guidelines developed with the cooperation of the U.S. government and endorsed by the past two administrations. The white paper stated, however, that "at this juncture in history . . . there is no viable

(Continued on Page 74)



Input Chart

Industry Size — 1980



Input Chart

Industry Size — 1981

Adapso: Revenues Up Average 23% In All Areas of Software, Services

By Marcia Blumenthal
CW Staff

NEW YORK — Despite the current recessionary economy, revenues of all segments of the software and services industry last year advanced an average of 23%, with software products firms the fastest growing segment, racking up a 42% revenue improvement.

The surge of sales of software for personal computers contributed a large portion of the growth of software firms, noted Peter Cunningham, president of Input, Inc. Cunningham presented the results of the annual computer services industry survey performed for the Association of Data Processing Service Organizations, Inc. (Adapso) at the trade organization's ninth annual financial analysts meeting here recently.

Applications software is becoming "a first resort" at larger, more sophisticated companies, which Cunningham said is a "definite change" from the attitude toward packaged software that these user companies exhibited in the past.

Overall, the computer service industry had total revenues of $18.9 billion in 1981, up from $15.4 billion in 1980. Most of the financial analysis on the Adapso survey was performed on firms whose revenues are greater than $10 million.

This year, for the first time, the survey included 30 system integrators. Taking revenue from this segment into account, overall service industry revenue growth was 24%.

(Continued on Page 76)

Silicon Valley Water Officials Clear Chip Makers

By Robert Batt
CW West Coast Bureau

SANTA CLARA, Calif. — Computer and electronics companies in Silicon Valley have been given a virtually clean bill of health following a major investigation into toxic chemical leaks that contaminated local water supplies.

A survey of more than 100 wells in Santa Clara County found only sporadic incidents of chemical contamination, county water officials said. The survey was conducted following the discovery of an underground leak of 1,1,1 trichloroethane (TCE), an industrial solvent, from Fairchild Camera and Instrument Corp., which caused the closure of a local well in December 1981.

While this well continued to show consistent levels of contamination, the other wells tested were pronounced clear, apart from one that displayed discrepancies in the test results. "One sample would show something and another wouldn't," a water official said.

Complete findings of the survey, carried out by Foremost-McKessen Environmental Laboratory of Dublin, were released June 17. The survey was undertaken during April and May and tested for the presence of 114 chemicals.

The Fairchild incident and the leaking of another chemical trichlorethyene (TCE) from an underground holding tank used by Intel Corp. had cast a shadow over the computer industry's reputation here for being a "clean" industry. Local residents feared contaminated water supplies could cause birth defects or miscarriages and the Semiconductor Industry Association also became involved in the controversy.

(Continued on Page 75)

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DG Ordered to Pay $504,140 Damages to OEM

By Jim Bartimo
CW Staff

RENO, Nev. — A federal court jury here has awarded Management Science, Inc. (MSI) $504,140 after a legal battle with Data General Corp. in which the software OEM charged the computer manufacturer with negligent misrepresentation and breach of warranty.

The dispute centered around MSI's purchase of 17 DG Nova 3/12 minicomputers for resale to its clients, according to Bill Kearn, president of MSI. His firm develops software for industrial engineering manufacturing productivity systems.

Problems Begin

Problems arose with the delivery of the first minicomputer in August 1978 when MSI found that the Nova 3's memory capacity was not great enough on which to run DG's RJE 80 communications software. "Data General said the RJE 80 software would fit into 32K bytes of memory," Kearn said.

"If the software is loaded into the computer, a message appears on the screen in plain English: 'Not enough memory capacity to run software,' " according to MSI legal counsel Charles Kilpatrick. "The jury got pretty angry when we did that in court."

"The screw-up came because Data General has different groups working on the communications software and the operating systems software with no formal method of testing," according to Kearn. "It came out in the trial through high-level memos that Data General was testing the communications software against the wrong operating system. They were testing against the RDOS operating system and we had DOS."

Deliveries Canceled

MSI canceled any further deliveries of the equipment in August 1979 (a year after receipt of the first mini), when efforts to correct the problem hit a dead end in DG President Edson de Castro's office, Kearn said. A change-of-policy request asking for either the rewriting of RJE 80 or new memory boards was rejected by DeCastro, according to Kearn.

Two months after the deliveries were canceled, MSI filed suit against DG and switched to Texas Instruments Inc. equipment. The OEM now uses TI DS990/1 minicomputers instead of the Nova 3s and will change its DG Eclipse 330 processor to a TI Model 16, Model 26 or Model 36 mainframe, Kearn said.

It was the change of equipment that led MSI to sue DG to recover $740,000 in damages. "We had a lot of application software we had to write," Kearn said. "We had to rewrite 150 programs for TI equipment."

The contract between MSI and DG included a "repair and replace remedy," which DG expected to protect them from prosecution if equipment failed, according to Kilpatrick. "The important aspect of the ruling," he said, "is that despite the contract, MSI recovered half a million dollars. They [a computer vendor] can't expect to be shielded from prosecution just because they give a repair and replace remedy."

The 17 Nova 3s were eventually sold to MSI clients after the memory problem was repaired. "Our local [DG] sales representatives begged, borrowed and stole the memory boards" to increase the memory capacity of the Nova, Kearn said.

"The Data General salesmen literally went to the warehouse and stole the memory boards," Kilpatrick said. The three salesman who testified in court that they stole the boards and gave them to MSI were Vic Majew, Paul Ray and Peter Kinney.

A DG spokesman said his company "will move for a judgment notwithstanding the verdict [in effect, asking the judge to set aside the jury's verdict]. It believes that a representation of the facts of the case will demonstrate that Data General met all of its obligations in a responsible and timely fashion. Any further comment regarding pending litigation would be improper."

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Tax Evasion Charges

Two Plead Guilty in OPM Case

NEW YORK — Two more people have pleaded guilty to tax evasion in the continuing federal investigation — dating back to March 11, 1981 — of OPM Leasing Services, Inc.'s business practices.

Joseph K. Verner, 41, of Petaluma, Calif., a former Fireman's Fund Insurance Co. employee, pleaded guilty on two counts of evading taxes in 1978 and 1979, when he allegedly received some $114,000 in kickbacks from OPM Leasing. The kickbacks were reportedly in payment for arranging rental of DP services from OPM by the insurance company.

The second defendant is Harold Farkas, 59, of North Woodmere, N.Y., who pleaded guilty to accepting kickbacks totaling $28,000 in 1979 and 1980. Farkas was president of the Jerry Silverman, Inc. textile company, where he reportedly arranged deals similar to those of Verner.

Verner and Farkas are scheduled for sentencing later this summer. They face maximum prison sentences of 10 years and $20,000 in fines.

So far, 10 people have pleaded guilty to charges stemming from the investigation involving OPM Leasing, which filed for reorganization in Federal Bankruptcy Court in March 1981, when questions were raised about the firm's business practices. The firm allegedly was forging leasing documents to obtain million of dollars in loans when the U.S. Attorney General's Office stepped in and launched its probe.

DEC Signs Lease Pact With ADCD

MERRIMACK, N.H. — Digital Equipment Corp.'s Original Equipment Manufacturers Group has announced the signing of an agreement to provide leasing services to present and potential customers of its Authorized Digital Computer Distributors (ADCD).

Under terms of the agreement with Digital Leasing, a division of U.S. Leasing Corp., ADCD distributors will be able to use the Digital Leasing sales force to assist in the financing of equipment and systems. Although prevailing market rates will apply, customers will have the benefit of single-source financing from a firm that specializes in the acquistion of data processing systems, a DEC spokesman stated.

Conditions include a minimum purchase worth $25,000 and orders must have been placed after last May 1. Digital Leasing products and Authorized Distributor application software are included.

Other features of the new program include a customized leasing document, short- and long-term financing for demonstration and research and development equipment, bridge financing to supplement existing unsecured credit lines and training seminars.

An introductory plan has also been annouced. Until June 30, a 36-month lease at the annual rate of 10.9% is being offered. The plan also calls for a 10% fair market value, purchase option at the end of the three-year period.

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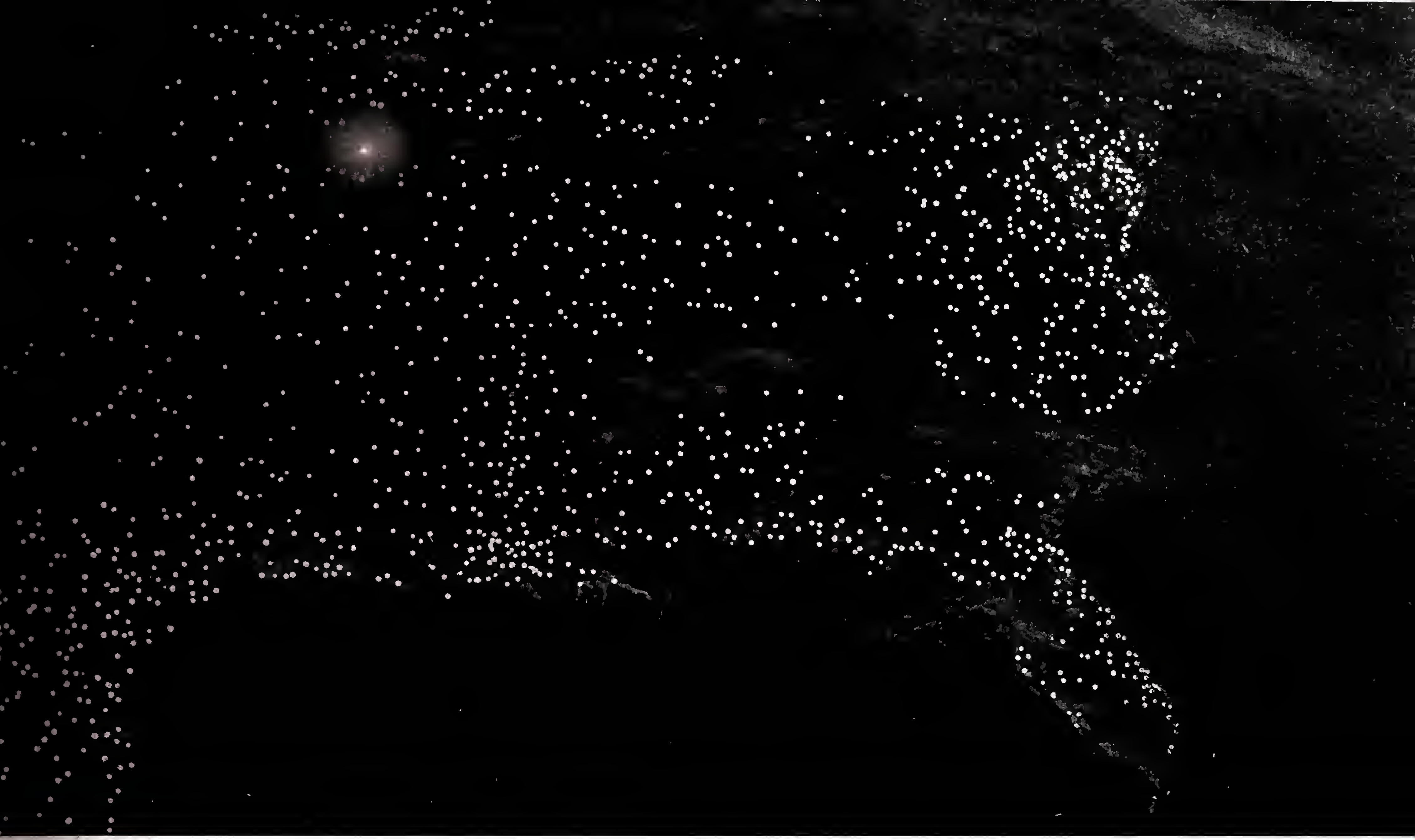

For example, the First Wisconsin National Bank has 1800 data terminals scattered over three states, updating accounts and exchanging information with the bank's computers in Milwaukee. If a terminal suddenly runs wild, part of the network is jammed.

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Supershorts

Franklin Computer Corp. has filed a major antitrust counterclaim against Apple Computer, Inc. and has denied that it has infringed any patent or copyright or otherwise violated any law in connection with the manufacture, sale or use of its ACE 100 personal computer. Apple filed suit against Franklin in U.S. District Court on June 12, 1982 charging the firm with copying Apple's computer programs in the form of diskettes and computer components known as read-only memory.

— — —

Micropro International Corp. has established a Tokyo-based Japanese subsidiary to market Japanese translations of the firm's business software for microcomputers. According to a company spokesman, Micropro is the first microcomputer software firm outside Japan to translate its products fully into Japanese. Shipments are expected to begin in July.

— — —

Herman Miller, Inc. has announced the formation of a new division, Computer Resources, which will be responsible for the development and marketing of computer software/systems.

— — —

Control Data Corp. expects earnings for the second quarter ending June 30 to be less than first quarter earnings per share of $1.01. A company spokesman said that while the outlook for the year in total is more uncertain than in recent years, the firm still expects 1982 earnings will exceed those of 1981.

— — —

Memorex Corp. is testing its Memorex 3680 disk drive at its Santa Clara, Calif., facilities and plans further testing at customer sites in early 1982. The 3680 attaches to IBM 308, 303, 4341 and plug-compatible CPUs via the Memorex 3683 disk control unit and 3888 subsystem controller.

— — —

A group of former employees has formed a corporation, Tylus Systems, Inc., and purchased the assets of the Custom Systems operations of GTE Telenet Information Services, Inc. Tylus will complete all GTE contracts under a subcontract arrangement and will continue to support customers of the IS/1000 product line with new systems and enhancements, upgrades, factory repair and refurbishments.

— — —

IBM has appointed University Computing Co. (UCC) as an authorized distributor of selected IBM products including the Ascii terminals — the 3101 display terminal and 3232 Model 51 keyboard printer. UCC is a wholly owned subsidiary of Wyly Corp.

— — —

Wabash Datatech, Inc. has established an Advanced Technology Center adjacent to its media coating plant in Huntley, Ill. The center is responsible for development of new high-technology flexible diskette and computer tape products as well as technological improvements in current media products.

— — —

General Electric Information Services Co. has begun the installation of new hardware, valued at $60 million, at its computer centers in Rockville, Md.; Cleveland; and Amsterdam, The Netherlands. The new equipment, which replaces older systems, includes 29 Honeywell Information Systems DPS-8/70 CPUs and 206 Storage Technology Corp. 8650 disk drives.

— — —

Management Science America, Inc. (MSA) and Honeywell, Inc. have announced a cooperative agreement for the development and marketing of MSA's financial, cash management and human resources software packages to users of Honeywell DPS 8, level 66/DPS and level 68 large-scale computers. The packages will be marketed in the U.S., Canada, the UK, Australia and New Zealand.

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Northern Telecom's Displayphone To Get Updated in Next Two Years

By Phil Hirsch
CW Washington Bureau

HOUSTON — Over the next two years Northern Telecom, Inc. intends to add significant capabilities to the Displayphone terminal it unveiled in February 1981 and has been actively marketing since last February. So said David G. Smith, the company's office products manager, in an interview here earlier this month.

Late in July or early in August, a software enhancement enabling the Displayphone to support the display protocols used by the Digital Equipment Corp. VT100 and IBM 3101 terminals will be announced, Smith reported. Within 18 months, the company expects to add personal computing, terminal-to-terminal electronic mail and word processing capabilities to the Displayphone.

IBM's success in marketing its Personal Computer has helped convince Northern Telecom that the business personal computing market is a substantial one. From a standing start less than a year ago, the Personal Computer has achieved a 10,000 unit/mo order volume, Smith said. Apple Computer, Inc. and Tandy Corp. "have also done very well indeed" in this same market, he added.

Emulation Capability

In addition to these new capabilities, Smith said, Northern Telecom plans to add emulation capability to the Displayphone, enabling it to communicate directly rather than via a private branch exchange (PBX) with IBM and presumably other companies' computers. The first version of this direct-connect capability, involving emulation of IBM 3270 CRT terminals, is due "in about two years," he said.

In the course of acquiring these new capabilities, the Displayphone will add a microprocessor and blossom into a family of devices that offer the user a choice of keyboards and display screens. Portability of the terminal is also going to be enhanced, Smith said. The present terminal weighs 13½ lb and can be transported in an independently manufactured case weighing another 6 lb.

The basic strategy behind these changes is to expand the Displayphone user base, now limited to what Smith called "senior decision-makers" and professionals such as lawyers and doctors. As he put it, "We want to appeal to different levels of the company without losing the user friendliness built into the present Displayphone."

Northern Telecom also plans to promote the enhanced Displayphone among users who employ other makes of PBX equipment or who work in environments that do not require PBX. This is one reason future versions of the terminal will include additional processing and disk storage capability.

Since active marketing of the Northern Telecom terminal began last February, order volume has increased steadily, Smith reported. Last month, 6,300 units were ordered and 1,200 were delivered. By the end of this year, Northern Telecom expects to sell at least 22,000 Displayphones.

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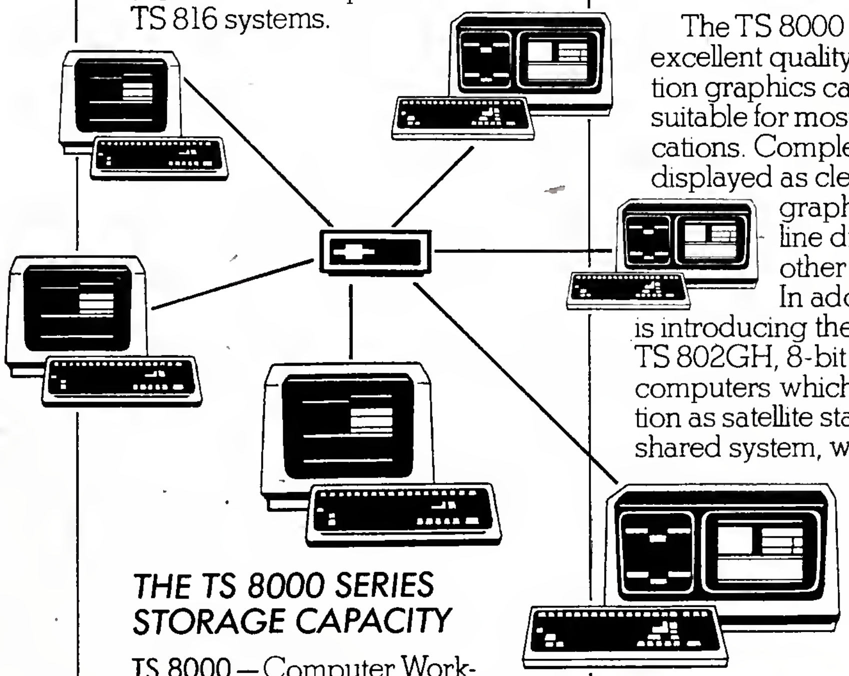
TS 8000 SYSTEM ENVIRONMENT

FEATURE: The TS 8000 series of fully integrated, stand alone computers are compatible with TeleVideo's 8-bit TS 806 and TS 816 systems' service processors. Up to six users are supported on the TS 806 and up to 16 on the TS 816 systems.



THE TS 8000 SERIES STORAGE CAPACITY

TS 8000 — Computer Workstation with 256K RAM.
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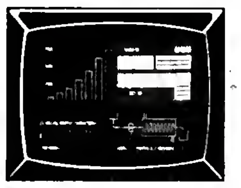
TS 8002H — Single floppy with 0.5 megabyte and one Winchester 5¼ inch disk for 9.6 megabyte of unformatted memory.

GRAPHICS CAPABILITIES



The TS 8000 series provides excellent quality, high resolution graphics capabilities suitable for most business applications. Complex data can be displayed as clear charts, graphs, diagrams, line drawings, and other visual effects. In addition, TeleVideo is introducing the TS 802G and TS 802GH, 8-bit stand alone computers which also can function as satellite stations in a shared system, with graphics capabilities.

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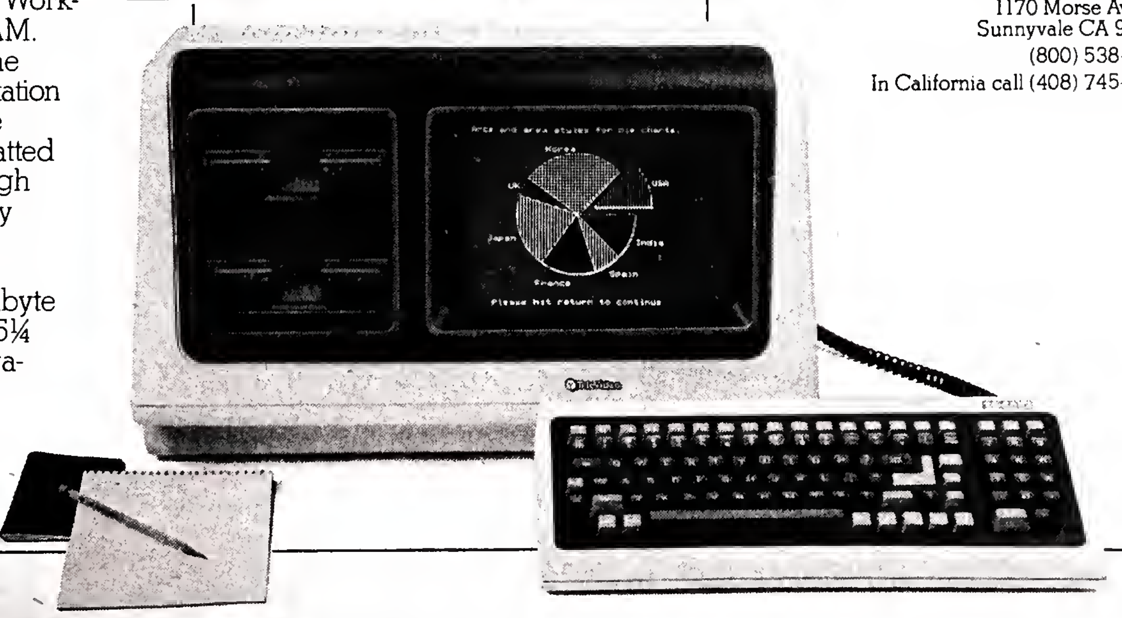

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Data Flows Seen No Threat to Canada

By **Jake Kirchner**

CW Washington Bureau

TORONTO — The Canadian computer industry recently intensified its efforts to counter growing support in that country for restricting the flow of information between Canada and the U.S.

Unfettered data flows between Canada and other countries do not threaten that nation's economic and cultural sovereignty and national security as some suggest, the Canadian Business Equipment Manufacturers Association (Cbema) said in a recent policy paper.

In fact, the paper stated, "the free flow of information across national boundaries is essential to the health and growth of the Canadian economy. Constraints, other than those required to ensure individual privacy and national security, will only serve to harm Canada's international competitiveness, impede Canada's general economic development and seriously retard growth in the vital information processing sector."

Suggesting "restrictions on the free flow of information will very often prove to be counterproductive," the association said information flows "enhance rather than harm the development of a Canadian information processing industry. "We suggest that by lowering federal tariffs and sales taxes on data processing equipment and introducing greater research and development incentives and export support programs, the government can do a great deal to assist in this development."

The association also said "modern information technology permits Canadian affiliates of international corporations a far greater degree of autonomy and control than ever before." It contended that "in the absence of evidence of any harm and in the face of very real economic benefits, there can be no justification for public policies that arbitrarily restrict the movement of information."

Cbema Calls For Participation

(Continued from Page 67)

set of precedents upon which a reasonably sound legal structure for controlling information flows can be based."

While the association's "free flow" stance is not new, Cbema executive Lloyd S. Kaufman said the level of industry and government awareness in this country is still low and the government still has inadequate mechanisms to address the data flow debate internationally.

The Cbema paper said "the U.S. government needs to establish a leadership role in its relations both at home and abroad in this regard. The dialog which has begun between industry and government representatives needs to be expanded to include both domestic and international aspects of information policy."

Continuing goals, Cbema said, should be to set basic information policy principles and to ensure collective industry-government opinions are heard in international debates.

Besides promoting free information flow, Cbema suggested two additional "basic principles" that the association said should "characterize a positive international environment for information technologies":

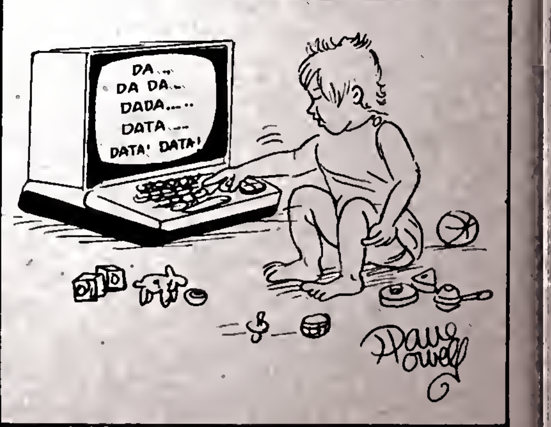
- "In view of rapidly changing technology, a policy of flexibility should be maintained in dealing with issues of international information flow." Nations should avoid adopting standards and regulations that "will stand in the way of optimal technology growth and information exchange."

"Information is not uniform," the paper asserted. "There is no single policy model for information flow that can be applied to the multitude of information types and uses in society."

The paper added that "those who would structure rules to govern the use of computing and telecommunications technologies and the flow of information across borders would be in error to the extent they assume that any rules based on today's perspectives of current capabilities and methods will apply equally well tomorrow."

- "There is an increasing need to adopt an international perspective to encourage international cooperation," Cbema said. Both developed and developing countries should, the association said, "work harmoniously and cautiously" toward "definitions and conventions to encourage technological growth and free information flow."

"In the context of the information age," the association paper stated, "all countries are still developing."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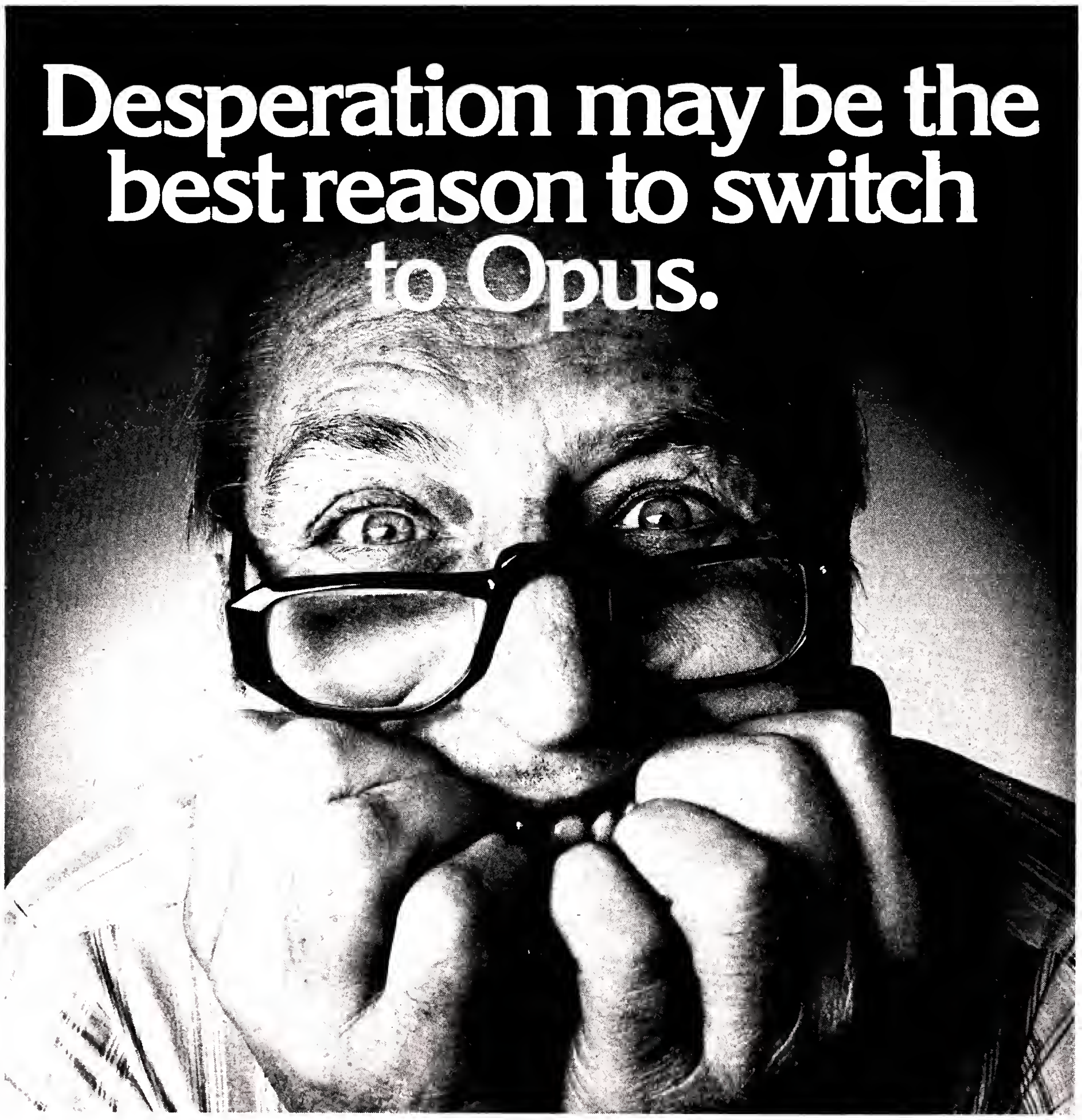
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Executive Corner

• Brig. Gen. Richard W. Pryor (USAF Ret.) has succeeded John B. McKinney as president and general manager of ITT World Communications, Inc., a unit of ITT Corp. McKinney has assumed the post of ITT Worldcom chairman.

• William J. Gotschall has been named president of NCR Comten, Inc., succeeding Donald J. Herman, founder and former president of the company. Herman has been appointed chairman of the NCR Corp. subsidiary.

• W. Dal Berry has been named president and chief executive officer of ECS Telecommunications, Inc.

• John D. Strickland has been appointed president and director of marketing for General Computing, Inc.

• Alvin B. Phillips has been named president, chief executive officer and chairman of the board of Micro General Corp.

• John L. Sullivan has been appointed president of ISSS, Inc.

• Lore Harp, chief executive officer of Vector Graphic, Inc., has been elected chairman of the board.

• Josiah Napua Jr. has been named executive vice-president of Wyle Laboratories' Electronics Marketing Group.

• Kenneth E. McClain has been named executive vice-president, Dorothy Oliver has been elected to the new post of vice-president, planning, and Robert M. Phillips has been promoted to vice-president, development, of General Computer Corp., a subsidiary of Revco D.S., Inc.

• Richard Weir has been promoted to the post of executive vice-president, operations, Al Vaitkus has been named vice-president, manufacturing, and Ron Whaley has been named vice-president, unit development, at Ibis Systems, Inc.

• James B. Aldrich has been promoted to vice-president, product strategy and management, and Neil Gorchow has been appointed to the new post of vice-president, product quality, at Sperry Univac.

Officials Clear Chip Makers

(Continued from Page 67)

The solvents are widely used as a degreaser and cleaning agent in the manufacture of chips, although the use of TCE was suspended when it was discovered that it caused cancer in laboratory animals.

Although the wells have been cleared of suspicion for the time being, water officials say they intend to set up some kind of future monitoring program of major wells in the county to assure that if anything does start showing up in the water supplies, it will be dealt with promptly.

"We want to involve the public in the drafting of any precautionary measures," said Dick Hathorn, assistant director of water and sewer utilities for the city of Santa Clara. "We want to work up a unified model ordinance that all local computer companies will adopt so that we have better control over the containerization of chemicals."

Hathorn said that although periodic tests would be carried out on the underground wells, there was still a problem of what to do with shallow ground water contamination resulting from seeping underground storage vessels containing volatile solvents.

He claimed that currently these could only be treated after a spillage has occurred. Officials are now looking at preventive measures such as a containment vessel that can be monitored. Hathorn speculated that such containers might be buried in pits that could be monitored rather than simply buried underground. Also, there was a case, he said, for using better building materials for the containers, which are usually made of fiber glass. "It seems strange that these containers should be failing at the same time," he added.

Meanwhile, the state water quality board has sent out questionnaires to 1,400 companies asking them what chemicals they have stored, where and for how long. In all, a total of 149 chemicals are being tested.

Whatever procedures are adapted here are likely to be followed throughout the heavily populated San Francisco Bay area where the computer industry together with 15 cities are working to develop rules for determining whether leaks are endangering drinking water and for preventing them from seeping into wells and aquifers.

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Mergers & Acquisitions

General Dynamics Corp. has reached an agreement in principle with **United Technologies Corp.** to sell its General Dynamics Communications Co. subsidiary and two of the major operating units of its Stromberg-Carlson Corp. subsidiary to United Technologies for $100 million.

Applied Technology Ventures has agreed to purchase **Digital Scientific Associates' Digital Scientific Corp.** and the marketing/manufacturing rights to the Meta 4/5000 minicomputer.

Wyly Corp.'s University Computing Co. has acquired GfA Exfdata, a group of data processing service bureaus headquartered in Nuremberg, West Germany.

ACS Systems, Inc. has acquired **Compuline Data Systems, Inc.**, a firm providing time-sharing services utilizing the IBM System/34 and System/38.

CGA Computer Associates, Inc. has acquired **The Software Shoppe** of Atlanta for an undisclosed sum, including 50,000 shares of CGA common stock.

Data Concepts, Inc., a developer and marketer of software products for commercial-lines insurance processing has merged with **Rockford Research, Inc.** of Cambridge, Mass.

National Semiconductor Corp. has acquired the assets of **Xciton Corp.** for an undisclosed sum.

Dasd Corp., the U.S. member of the Paris-based Cap Gemini Sogeti group, has signed an agreement to purchase all the authorized stock of **Spiridellis & Associates, Inc.**

U.S. Datacorp has been acquired by **Anacomp, Inc.** At the time of the acquisition, Datacorp sold eleven of its service centers to **Kalvar Corp.** Kalvar will operate the centers under the U.S. Datacorp name, according to a Datacorp spokesman. Anacomp is operating the remaining service centers under its own name.

If you think nothing much has happened in software since our last software *Extra!*, wait 'til you see September's

This September 1st you'll be getting an entire issue of *Extra!* devoted to software — the driving force that's re-shaping the computer marketplace. In 1980, software revenues were $5,090,000,000. By 1985, International Data Corporation (IDC) predicts that they will reach $16,885,000,000.

Software is taking an increasingly larger share of EDP budgets. Actual 1981 spending for software was 30% higher than for 1980 — a 5% higher growth in spending than had been planned. And this was in a year when nearly all other spending was *less* than had been anticipated.

But the real story is not software's increasing importance in EDP budgets, it's the rapidly-changing software environment. And September's *CW Extra!* "The Changing Software Environment" gives you survival techniques and the skills and tools you need to stay involved in the the changing flow of information that the new software is generating. Here's just some of what this September 1st software *EXTRA!* will cover for you:

- New Database Management systems
- New, more powerful languages
- Problems in eleiminating the backlog in applications devices
- Software maintenance and reliability issues
- Executive workstations/Decision support stations
- Software protection
- Information engineering
- The Information Center — the new liason between the DP/MIS department and the user

And, you'll get a new feature this *Extra!* — the software roundtable. You'll get a discussion on optimizing the software resource with DP Manager Joseph Allard; Software Maintenance Expert Carma McClure; Applications Development Expert Denis Connor and Service Bureau/Time Sharing Expert Richard Crandall.

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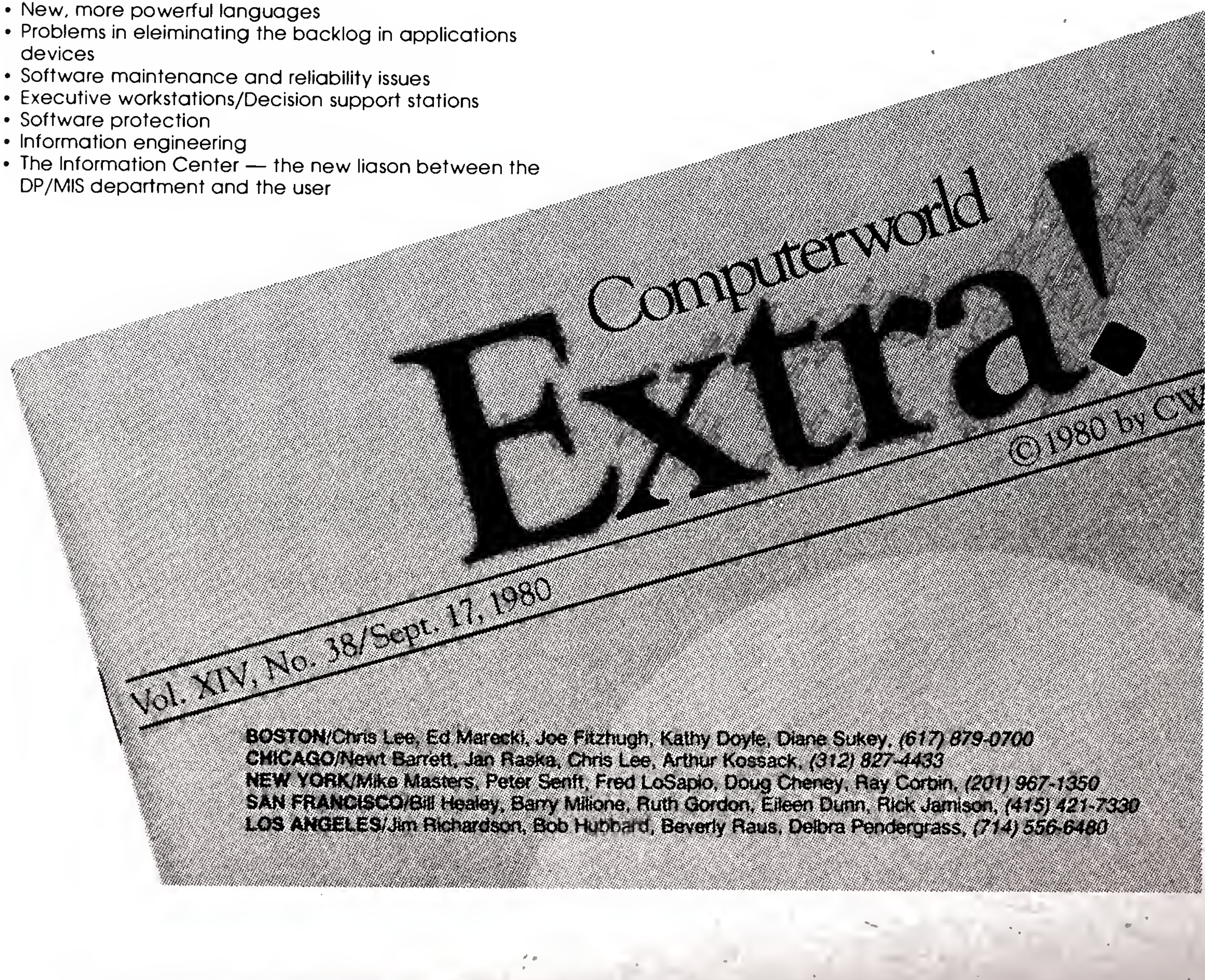

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Revenue Up 23% In Software Field

(Continued from Page 67).

Within the various service industry segments, Adapso reported the following results. The survey reports both overall revenue and revenue and profitability at 75 publicly traded firms.

Processing Services — This segment accounted for just over $10 billion or 45% of the service industry's total revenues. However, in 1980 this group accounted for 49% of the industry revenue pie (see charts).

Revenue for this sector was relatively flat compared to 1980, growing at 18% last year vs. 17% in the prior year. Publicly traded processing services firms had revenue growth of 25% last year, compared to 27% in 1980. Pretax profits last year were 13.1% on the average, down from 13.6%.

Transaction processing and sales of specialized data base services were the hottest items offered by these firms last year.

Professional Services — This group of companies, the second largest in the software and services industry, had revenues of just under $5 billion last year, representing 23% of the total industry revenue.

Revenue growth last year was 21%, compared to 27% in 1980. By contrast, publicly traded firms posted revenue gains of 29% last year vs. 34%.

Pretax profit slipped from 8.4% in 1980 to 7.2% last year, Adapso reported. The major reason for the slippages in revenue and profitability was the drying up of government business, the survey revealed.

Software Products — This sector garnered just over $4 billion in revenues last year, or 19% of total software and service industry revenues, up from 16% of total revenues in 1980. Overall revenue growth for this segment was up 42% from 1980. 1980 revenue growth over 1979 was 31%.

For publicly traded firms, 1981 revenue growth was 46%, compared to 36% in 1980. Pretax profits of publicly traded companies grew 57%, averaging 16.8%, up from pretax profits of 10.7% reported in 1980.

System Integrators — This newly included category had revenues of about $2.9 billion, up from revenues of about $2.2 billion in 1980. In the publicly traded sector, revenue growth slipped from 66% in 1980 to 35% last year. Pretax profits were down slightly last year, 14.9% compared to 15.5% in 1980.

The largest firms in this sector are involved in computer-aided design and manufacturing systems and software.

Price increases of software and services accounted for a small portion of revenue growth. For software products prices advanced by an average of 11%, while for processing and professional services prices increased abut 4%. System integrators, on the whole, did not raise prices last year.

As for prospects for the performance of software and services firms during 1982, Cunningham said it would be less robust than last year, but not by a really significant degree. There are some segments in the industry that require change, but, he said, Input expects the industry to reach the $50 billion mark by 1986.

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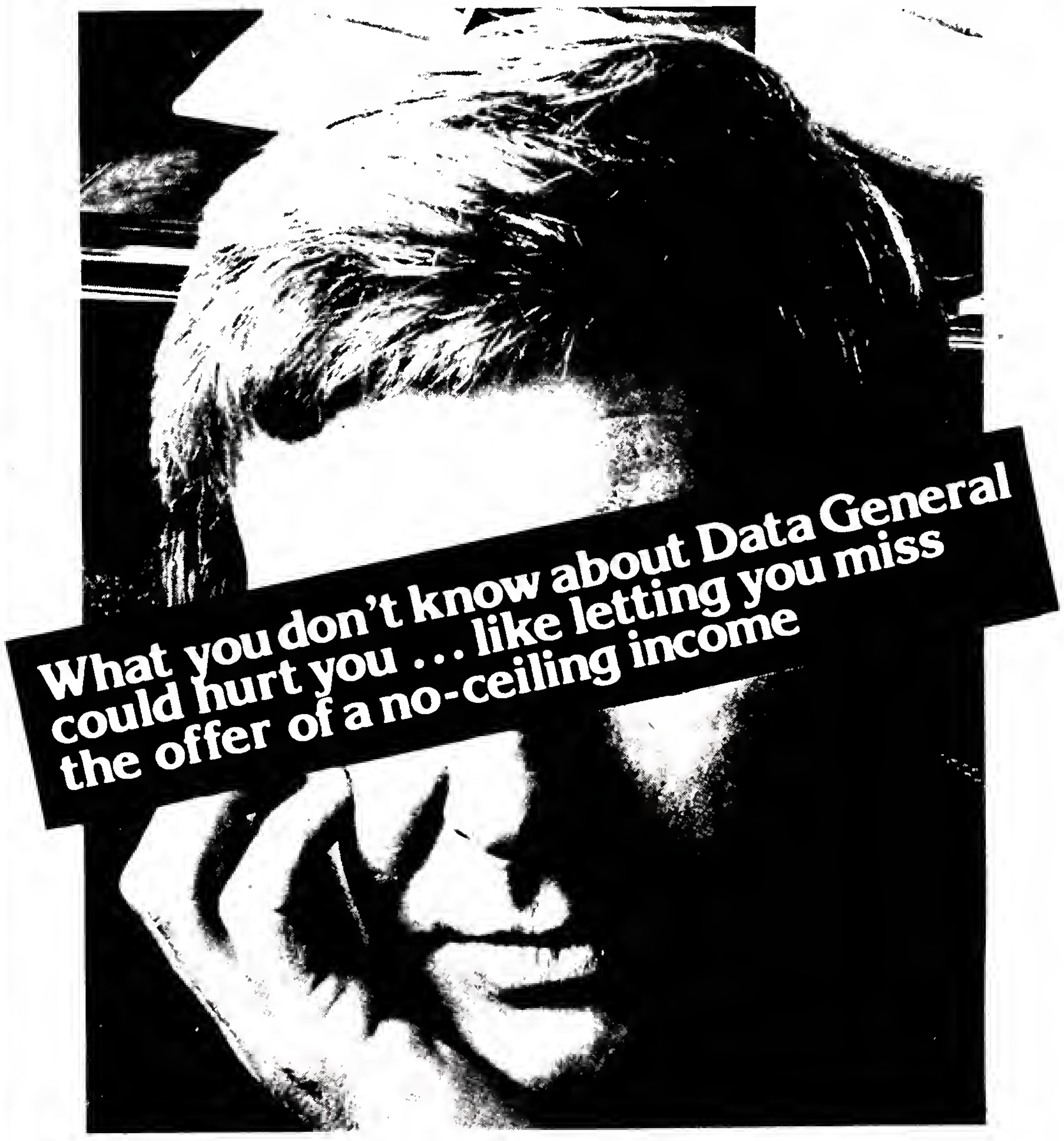
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SYSTEMS PROGRAMMER II

Writing complex non-application oriented programs and sub routines are the primary responsibilites of this position. Related tasks include program installation, testing and modification as well as the adaptation and maintenance of purchased software. To qualify a candidate should have a related degree and three (3) or more years experience working as a analyst/programmer in the field of systems programming and teleprocessing.

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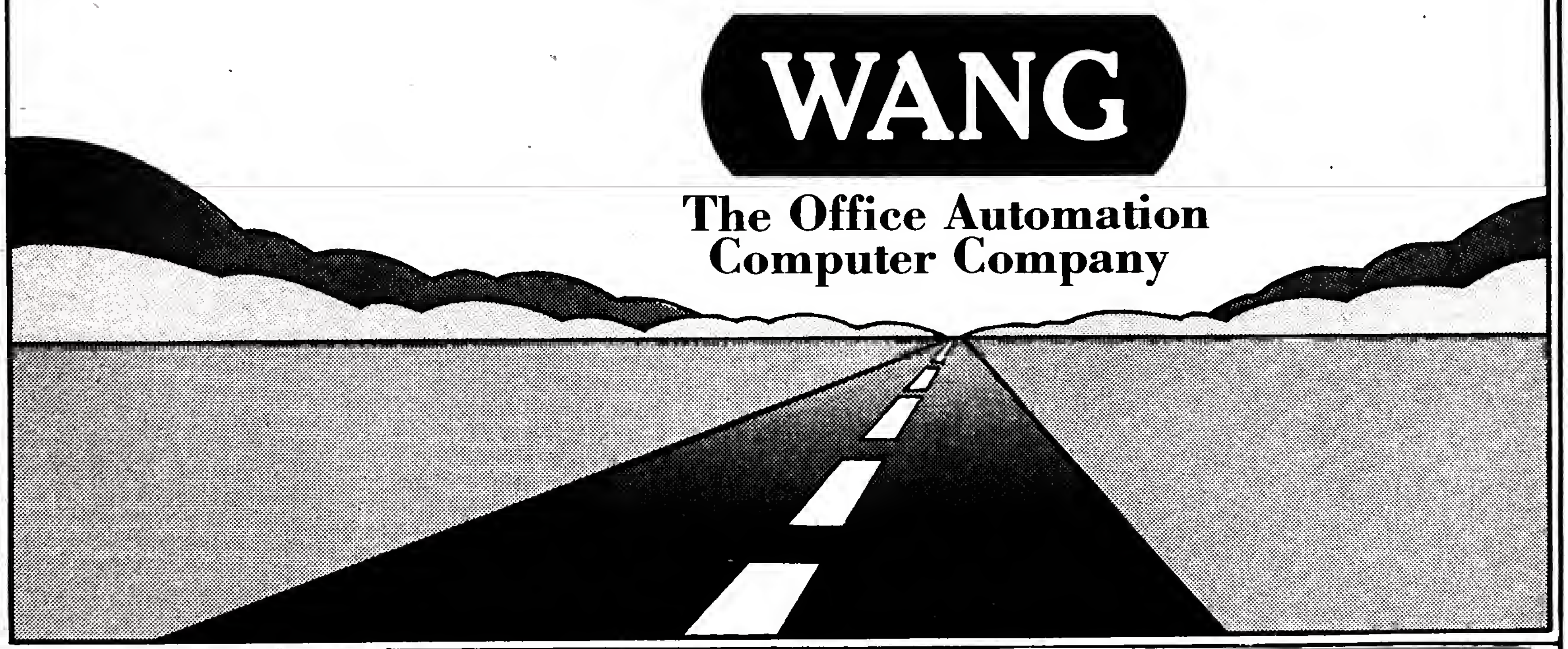

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West Virginia Network for Educational Telecomputing, the state-wide computer network for higher education in West Virginia, has five openings for systems programmers. WVNET current CPU configuration is an AMDAHL V7A-VM/VS1/MVT, conversion to MVS in progress, ITEL AS/5 - in MVS, 3-VAX 11/780-VMS, 13-PDP 11/44-RSTS.

WVNET is located in Morgantown, WV, a community of 45,000 with a major university, WVU. Morgantown is just 70 miles south of Pittsburgh, PA.

The following positions are available:

IBM SENIOR SYSTEMS PROGRAMMER

Bachelors Degree and two year IBM systems programming, demonstrated proficiency in Assembler Language, one higher level language, knowledge of problem solving, systems analysis and design.
Salary upper 20's.

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Bachelors Degree and two years DEC systems programming, demonstrated proficiency in at least one higher level language, problem solving, systems analysis and design, demonstrated ability to perform independent creative work..
Salary upper 20's.

IBM LEAD SYSTEMS PROGRAMMER

Bachelors Degree and three year's IBM system programming, detailed knowledge of the internal structure of various operating systems, provides, supervision and technical assistance to senior level systems programmers.
Salary mid 30's.

SUPERVISOR DEC SYSTEMS

Bachelors Degree and three year's DEC systems programming experience with one year supervisor systems programming, detailed knowledge of the internal structure of various operating systems, proficiency in several higher level languages.
Salary mid 30's.

SUPERVISOR IBM SYSTEMS

Bachelors Degree and three year's IBM systems programming experience and one year supervisor systems programming, detailed knowledge of the internal structure of various operating systems, proficiency in Assembler Language and several higher level languages.
Salary upper 30's.

The closing date for the positions are July 7, 1982. Send resume to: Personnel Officer, WVNET, 837 Chestnut Ridge Road, Morgantown, WV 26505. Phone (304) 293-5192.

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DRC

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CONTACT: John Staiger

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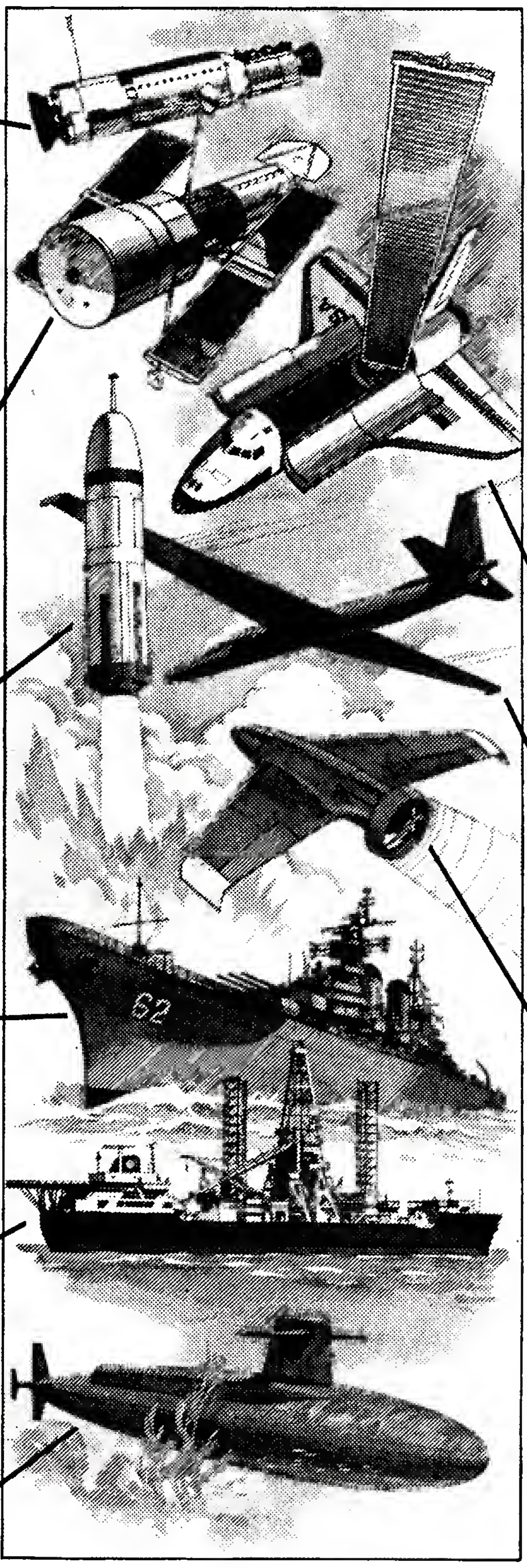

Lockheed has more continuing experience in the development and deployment of various spacecraft and satellites than anyone else.

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To professional computer scientists, software development engineers and CS Analysts, we can offer the kind of diverse fulfillment that you've always hungered for. Working on projects that play a critical role in maintaining America's forward edge, both at sea and in space. And our computer environment is one of the most complete in existence. If this sounds like your idea of excitement, and if the projects shown here are the kind you'd like to participate in, look to Lockheed. No one can offer you more.

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If you're a qualified computer scientist who'd like to be considered for a more exciting career, please send your resume to us in care of Professional Employment, Dept. 653-0628, P.O. Box 504, Sunnyvale, CA 94086. We are an equal opportunity, affirmative action employer. U.S. citizenship is required.

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Can Your EDP Talents Contribute To Our University's Distributed Data Processing Network?

We are the newly created Department of Management and Information System Service of the University of Medicine and Dentistry of New Jersey. We have just been charged with the implementation of our long range plan: the installation of a distributed data processing network serving our campuses in Newark, Piscataway and Camden.

Opportunities now exist in all three areas of the Department:

- TECHNICAL SUPPORT, including
  - SYSTEM PROGRAMMER
  - DATA BASE ANALYST
  - DATA COMMUNICATION ANALYST COORDINATOR
- APPLICATION DEVELOPMENT, including
  - SYSTEMS ANALYST
  - PROGRAMMER ANALYST
  - MANAGEMENT ENGINEER
- OPERATIONS
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  - COMPUTER OPERATOR

These diverse specialists will operate in an environment that includes networked dual IBM 4341's utilizing VM/VSE, ACF/NCP in support of IBM's 8100 distributed systems, the New Jersey Educational Computer Network and the University's HP scientific network.

Project teams are now being staffed to support the full spectrum of financial, human resource, academic administrative and health care systems needed by this comprehensive state-wide medical delivery and educational institution. You will be using such state-of-the-art development software as VM/CMS/SPF, a data management dictionary, DL/1, CICS/VS, 8100 DPPX with high-level application development tools, ADS, Easytrieve, SQL as well as the standard support languages.

We offer a competitive salary package commensurate with experience and excellent benefits including tuition assistance program. Send resume to: Cliff Koblin, UMD, 100 Bergen Street, Newark, N.J. 07103.

University Of Medicine And Dentistry Of New Jersey

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Join a progressive, multi-division, international company in metal fabrication whose sales exceeded 250 Million in 1981.

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Valmont offers a competitive salary and benefit package, employee savings program, merit program based on performance, job posting system, relocation assistance to an area offering a variety of lifestyles: large city, suburban, small city, rural or recreational lakeside, and much more.

Interested candidates may submit their resumes, including salary history, or call to find out what our Company can offer you. Call (402) 359-2201 or write to: Vanessa Brown, Human Resources Dept.

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VALMONT

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Reply to CW-A3279
Computerworld
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Framingham, MA 01701

Data Processing

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New Jersey Institute of Technology seeks a Programmer to consult with academic users in use of applications programs, job control language, program preparation and debugging on both local and remote computer facilities. Knowledge of Fortran and at least 5 of the following: APL, Basic, Pascal, Assembler, PL/1, Univac-JCL, EDP, IBM-JCL, COBOL. Degree in a scientific discipline or equivalent or at least 2 years experience as a Programmer. Starting salary in low to mid $20's. Send resume to: Personnel Office, Box PI.

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Computerworld
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Framingham, MA 01701

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In charge of structuring, coding & debugging programs for applications relating to financial institutions. Must have knowledge of COBOL. High School education required. 2 yrs or 2 yrs in programming. $446.50 per week to work 40 hrs/5 days/wk. Please send resumes:

Computer Technicians, Inc. 646 Highway 18 East Brunswick, NJ 08816

NETWORK SPECIALIST

The City and County of Denver is looking for a Communications Network Specialist to plan, develop and coordinate the installation and maintenance of all computer data communications equipment (analog, digital, microwave and cable) in support of the City's data processing systems. Requires 4 years of experience in various aspects of data communications hardware and software, knowledge of hardware-software interaction, plus one year of experience in general management, planning and analysis. Appropriate education may be substituted for 1 year of management experience or 1 year of experience in data communications. Competitive benefit package. Salary range: $2,321 - $2,901 per month. Apply by August 16, 1982 to:

Don Braden, Personnel Analyst
414 14th St. Denver, CO 80202
eeo m/f/h

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Extraordinary opportunity for top notch DP Professional to manage large scale multi-user minicomputer operation. Must have at least 4 years experience in application systems design, supervision of programming staff, interfacing with users, and minicomputer background utilizing COBOL in an interactive environment. Permanent position with expanding and well established inland empire firm offering excellent salary and benefit package. If you meet the above requirements and are interested in getting involved at the ground level of a system conversion and expansion, send your resume and salary history to:

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Redlands, CA 92373

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PRIME Instructor to start a new program of Computer Operator/Programmer. Must be familiar with DEC equipment - RSTS/E operating system, BASIC, COBOL, Pascal and Assembly language. Minimum three (3) years experience in industry or business experience as programmer or analyst. Eleven (11) month contract to start as soon as possible. Salary open.

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We're also seeking a
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Product Specialist
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Please send your resume to **Jeanne Abbott, Employment Specialist, 1855 Barber Lane, Milpitas, California 95035. Or call her COLLECT at (408) 942-1212.** We are an equal opportunity employer.

System Industries

Systems Software Analyst

Realize your career potential with Colorado Interstate Gas Company, a pioneer in the long distance transmission of natural and a subsidiary of the Coastal Corporation. This is an exceptional career opportunity with one of the most prestigious and respected companies in the field of natural gas.

If you are qualified, we urge your immediate response.

Your responsibilities will include the planning, installation, generation, tuning and problem diagnosis for MVS/SE, JES II, TSO/SPF. At least two years experience in all of the above required with supportive experience in ACF, MCP/VTAM, MSMF, and CICS highly desirable.

Solid growth potential, job stability, salary commensurate with experience and complete company paid benefits package, including paid dental with separate family coverage available. For immediate consideration please send your detailed resume, complete with salary requirements to Employment Section 178A, COLORADO INTERSTATE GAS COMPANY, P.O. Box 1087, Colorado Springs, CO 80944. We are an equal opportunity employer m/f/h/v.

Colorado Interstate Gas Company
A Subsidiary of The Coastal Corporation

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A 4331-Group II mainframe...on-line programming...an integrated data base...CIF, CICS, VSAM, Tele-communications ...PLANNED upgrade to a 4341, ATM's, new financial terminals...3375's...time-and-a-half after 40 hours...2 raises in the first year...3 weeks off after 1 year...a relaxed life-style in a community of 20,000 (where 4 cars in an intersection is a traffic jam)...15 minutes commute to work...a small department where your contributions are recognized! Those are just a few of the things we've got to offer to you.

If you have 3-5 years' COBOL programming experience, contact us! It could be the most important contact you ever make! Call or send your resume to Stephen C. Norcross, Director of Personnel, at:

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ASSOCIATION OF VALPARAISO
56 S. Washington St./Valparaiso, IN 46383
(219) 462-4131

an Equal Opportunity Employer

West Virginia Network for Educational Telecomputing, the state-wide computer network for higher education in West Virginia, has openings for the following:

DATA COMMUNICATIONS SUPERVISOR

Bachelors Degree and three year's related work experience, knowledge of and experience with data communications systems (e.g. modems, multiplexors, test equipment, etc.), technical supervisory experience.
Salary lower 20's

DATA BASE SYSTEMS MANAGER

Bachelors Degree and six year's work experience in programming or analysis or equivalent, one year experience in a data base management system, one year experience with CICS application programming, thorough knowlege of system procedures, and techniques, demonstrated proficiency in two higher level languages.
Salary mid 20's.

WVNET current CPU configuration is an AMDAHL V7A-VM/VS1/MVT, conversion to MVS in progress, ITEL AS/5 - MVS, 3-VAX 11/780-VMS, 13-PDP 11/44-RSTS, 2-DCA 355 communication systems.

WVNET is located in Morgantown, WV, a community of 45,000 with a major university, WVU. Morgantown is just 70 miles south of Pittsburgh, PA.

The closing dates for the positions are July 7, 1982. Send resume to: Personnel Officer, WVNET, 837 Chestnut Ridge Road, Morgantown, WV 26505. Phone (304) 293-5192.

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State of Montana
Salary $20,864 - $27,535

Duties include assisting with the installation and maintenance of the IDMS Database System Software and providing technical assistance in the analysis and feasibility of new databased applications. Requirements for this position are knowledge and expertise in the following areas: COBOL programming language, TSO/SPF usage, IBM OS job control language (JCL). Intangible benefits include small population approximately 30,000 city life, excellent outdoor life, beautiful surroundings, opportunity to live affordably within walking distance of work or within a twenty minute drive with acreage in the country. Apply by July 16, 1982 to:

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The key individuals we seek at this time will be Programmers and Analysts who are strongly oriented to space systems, and they will be professionally "at home" working with state of the art techniques in flight dynamics, including:

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The hardware and software focus on IBM 360/95, DEC (PDP 11/70), VAX 11/780, IBM 4341, with significant experience in MVS, FORTRAN, ASSEMBLER.

For immediate consideration, forward your resume in strictest confidence to Jim Aquino.

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Planning Research Corporation
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We currently have an IBM 3033 installation operating under OS/MVS. Programmers should have considerable COBOL programming skills and experience with CICS would be helpful.

The Paul Revere Insurance Company employs 1200 people in its home office operation in Worcester, MA. We can offer an excellent benefit package and salary commensurate with experience.

If you would like to become part of a progressive, dynamic company, call or write to:

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Our sophisticated Park Ave. client has a situation available for the top-notch pro to supervise the development of several CICS projects. Strong design exp. in CICS required, as well as a thorough knowledge of manufacturing applications. This progressive IBM/OS installation needs a fast-track individual to impact in a management capacity. Benefits pkg. incl. a stock purchase program & pension plan. $37,000 FEE PAID.

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Must have 4 years experience in large system computer programming. A minimum of 1 year experience as a Systems Programmer. A knowledge of CICS/VS, ACF/VTAM and DL/1 preferred.

Individual will be involved in converting our IBM 370/158 to a VM/SP system with enhanced CMS.

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Must have 10 years of data processing experience, including the development of large IBM on-line systems, project management, user interface, data base, CICS and COBOL. DMS and ALC helpful. This position will interface with multiple departments and requires excellent interpersonal skills. Ability to handle details and follow-up a must. Starting salary $32-35K. Competitive benefits package.

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Bill Tobin
Assistant Vice President
Information Systems
Planning and Development
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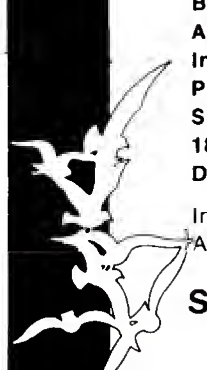
Dallas, Texas 75201

Individual inquiries only.
All inquiries kept confidential.



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Ph. D. in Computer Science or Computer Engineering or in a closely related discipline with emphasis in programming languages, data base-organization and structure, microprocessors, operating systems, data processing, system analysis, digital design, computer architecture, and software engineering.

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Apply with complete resume on academic, professional and personal data, list of references, publications and research details, and with copies of transcripts and degrees, including home and office addresses and telephone numbers to:

University of Petroleum & Minerals
Houston Office
2223 West Loop South, Suite 410
Houston, Texas 77027

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Digital Communications Associates, Inc., a rapidly growing company in the data communications industry, has openings for

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The software field engineer will research and resolve customer problems with DCA's microprocessors-based network processor. Customer contact and travel (to 30%) are required.

Two to four years experience in assembly language programming is required with microprocessor and data communications a plus.

If you have the appropriate experience and would like to explore this opportunity further, please call or write:

Bill Posey

dca
Digital Communications Associates Inc
303 Technology Park Norcross Georgia 30092
404 448 1400

An Equal Opportunity Employer

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NCR/Columbia--a major facility of a multi-billion dollar computer company--specializes in the design, development and manufacture of microcomputers, data communications and word processing systems. We seek a Software Instructor for our Internal Educational Group.

Responsibilities will include instructing engineers and programmers in various software areas; high level and Assembly level languages; use of operating systems and structured design. You will also be in charge of course development and upgrading classroom materials as new software and systems are developed. A BSCS with teaching experience or a BS in Education with experience in teaching programming courses is required.

For immediate, confidential consideration, please send your resume and salary history to:**Mr. Glenn Rannick, NCR Corporation, Dept. G55, 3325 Platt Springs Road, West Columbia, SC 29169, or call collect, (803) 796-9250.**

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DATA PROCESSING MANAGER
Scott County Government
Davenport, Iowa

Complete technical and management responsibility for the planning, development, and operations of automated systems for a variety of governmental applications in an IBM 4341-OS/VS1 environment including an extensive telecommunications network. BA-BS degree plus 5 years progressively responsible systems design and management experience. Starting salary of $25,700 to $30,200 with excellent growth potential. Employer provides liberal benefits program. Scott County is located in the heart of the quad cities metropolitan area which has a population of over 380,000. Qualified applicants should send resume to:

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Personnel Services Office
450 North Crescent Drive
Beverly Hills, Ca 90210
(213)550-4830

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EXPOSE YOURSELF

Thousands of companies are searching for computer personnel with the following qualifications:

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- MARKETING REPRESENTATIVES
- MARKETING MANAGERS
- SYSTEMS/DATA BASE EXPERTS
- OPERATIONS SPECIALISTS
- COMMUNICATIONS SPECIALISTS
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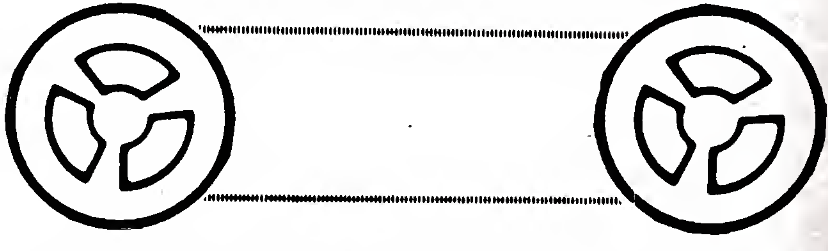

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The Pan American Health Organization is seeking qualified candidates to serve as a project leader and supervisor in information processing and data base/communications application. Requirements include: a university degree in business, data processing, mathematics, or a related field; five years' experience in programming, two of which include supervisory functions; experience with 370/138, DOS/VS, and DB/DC software; and demonstrated ability to program in ALC, COBOL, FORTRAN or PL/1 languages. Applicants should forward their resumes to:

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The Computer Science Program has several openings for Lecturer positions involving teaching of programming languages and the participation in a number of projects among which are the computer-aided instruction and the computer graphics projects. The positions are open for the academic year 1983-84, starting 1 September 1983.

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Candidates are expected to have M. S. degree in Data Processing, Computer Science Program, or an equivalent degree in a related field, with a working knowledge and/or experience of COBOL, PASCA, 370 Assembler Language, Fortran, PL/1, Data Base Organization, Operating System, or similar areas.

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2223 West Loop South, Suite 410
Houston, Texas 77027

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Horacio Estrada
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P.O. Box 45000
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Interested persons should send a resume with education, work experience and references to: Mr. Gerald Nix, San Juan College, 4601 College Boulevard, Farmington, NM 87401 or call 1-505-326-3311.

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Box 880
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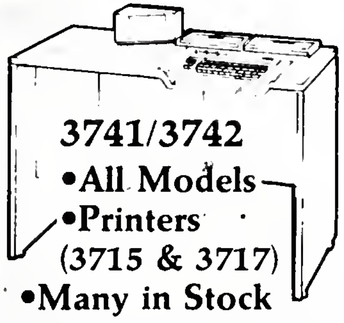

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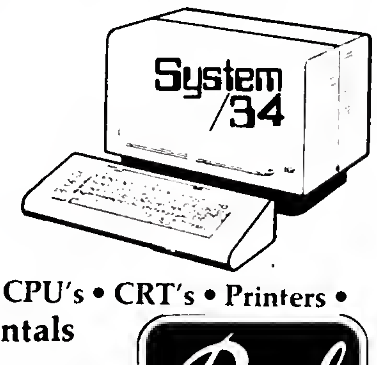

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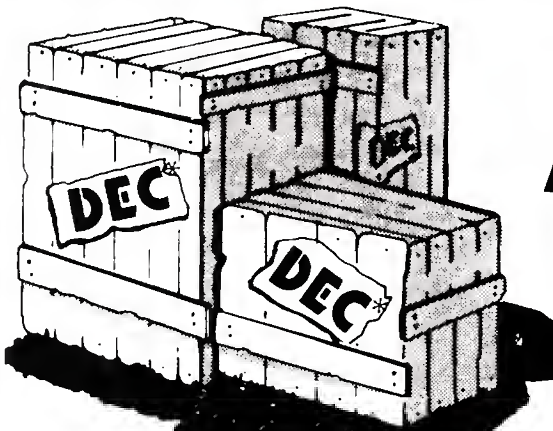

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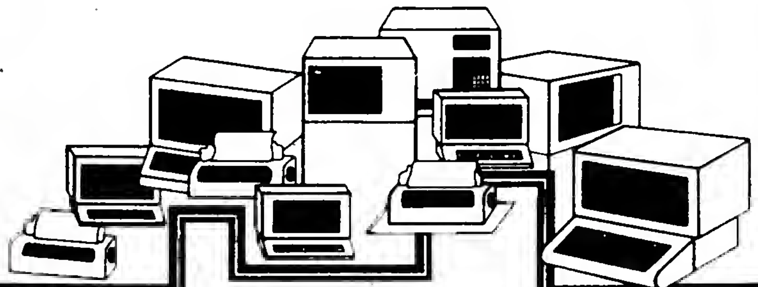

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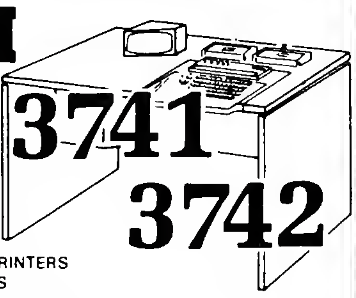

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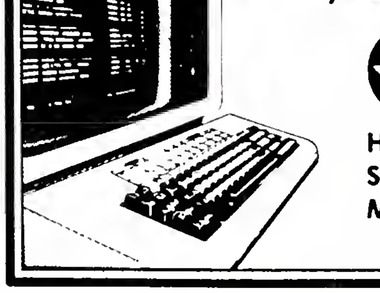

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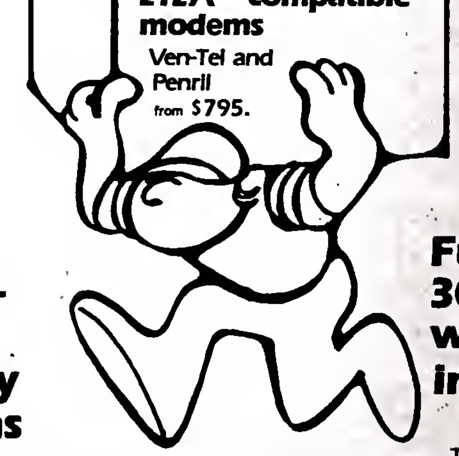

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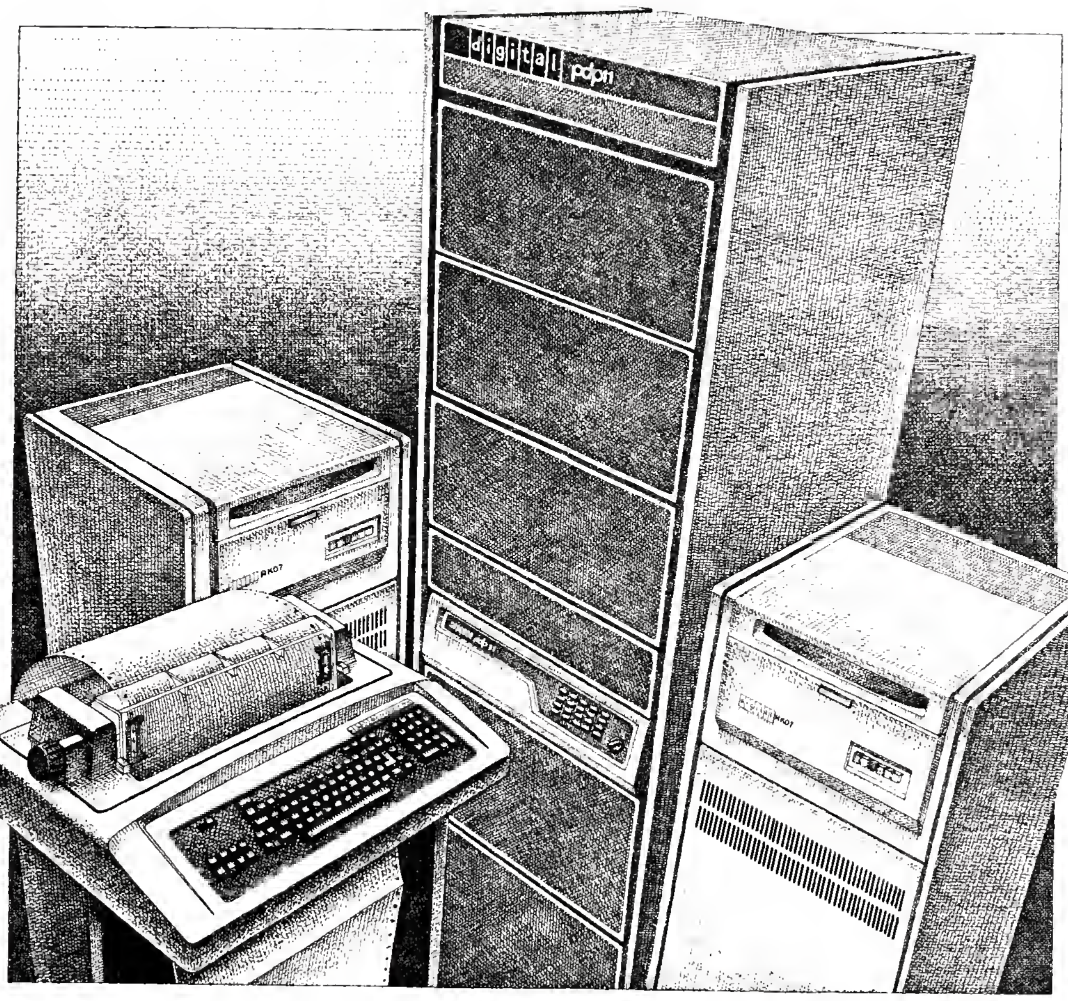

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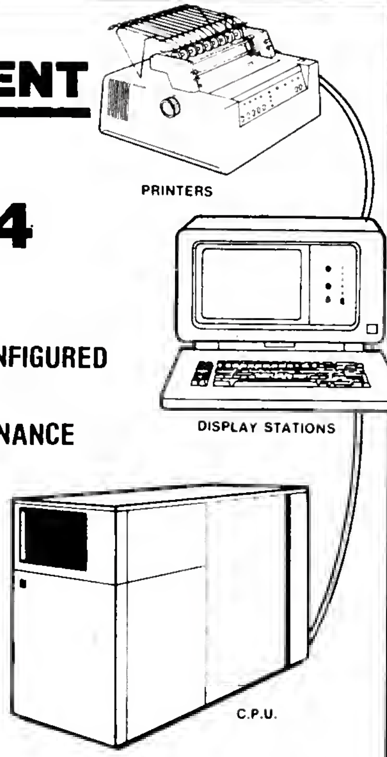

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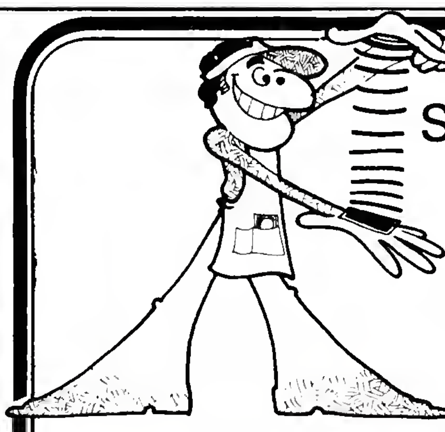

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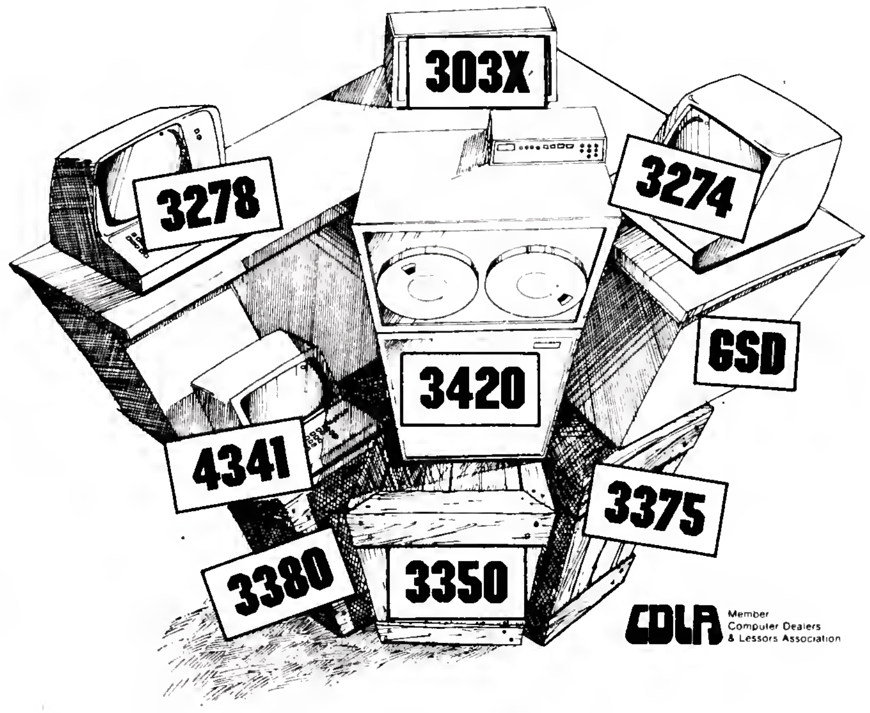

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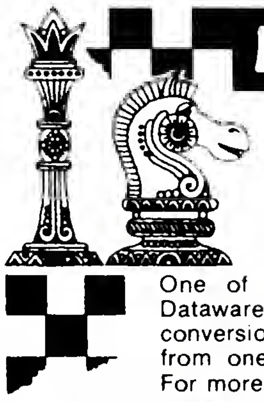

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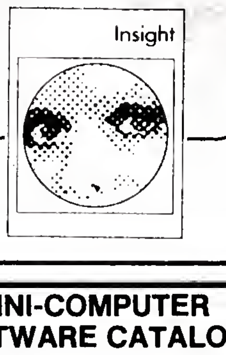

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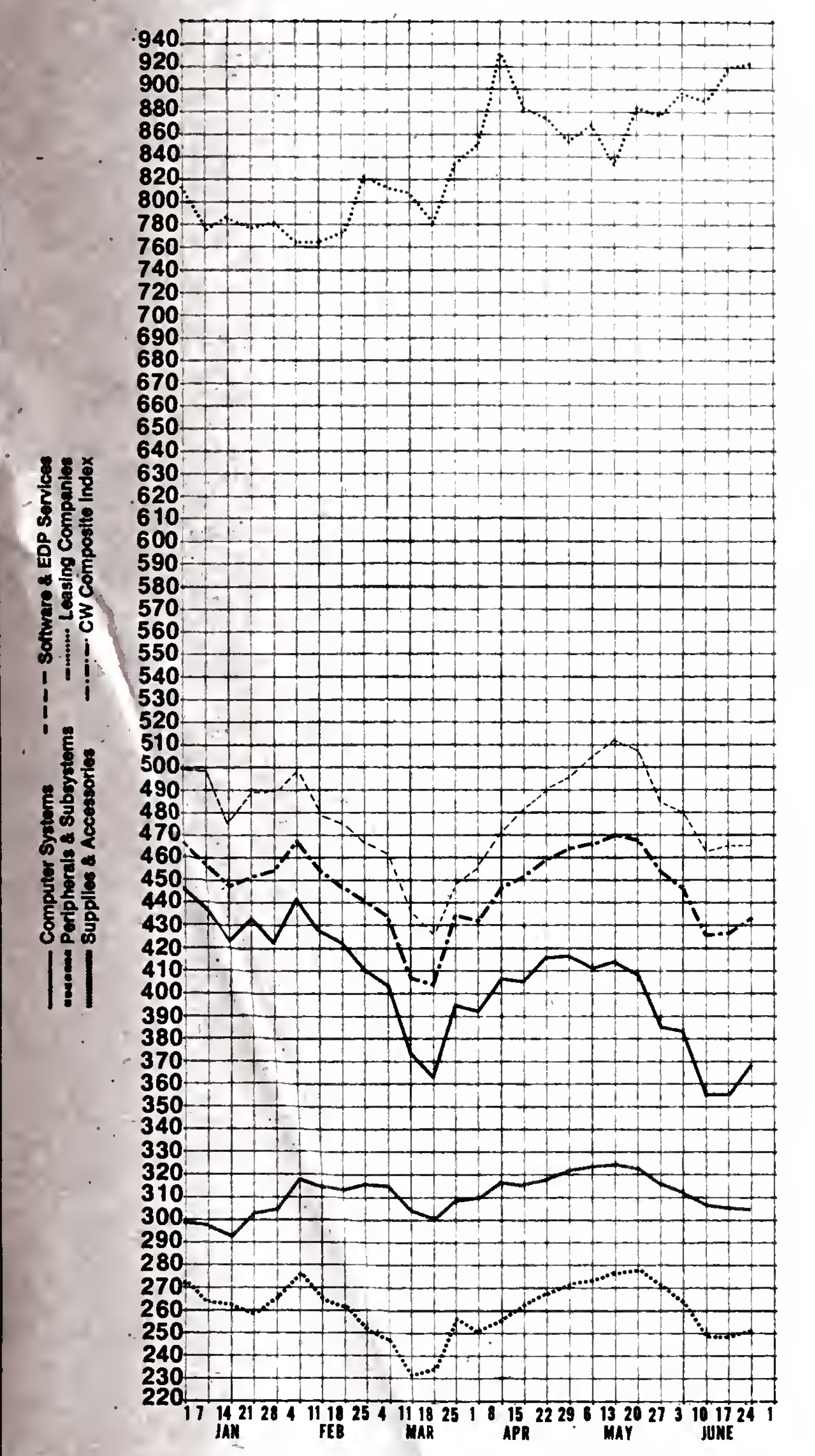

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CLOSING PRICES WEDNESDAY, JUNE 23, 1982

COMPUTER SYSTEMS

EXCH		1981-82 RANGE (1)	CLOSE JUN 23 1982	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMDAHL CORP	18- 46	19 1/4	+ 1/8	+0.6
N	BURROUGHS CORP	28- 72	34	+1 7/8	+5.8
O	COMPUTER AUTOMATION	8- 28	7 3/4	- 3/8	-4.8
N	CONTROL DATA CORP	19- 42	24 3/4	+1 1/4	+5.3
N	CRAY RESEARCH INC	20- 49	24 3/4	+1 7/8	+8.1
N	DATA GENERAL CORP	25- 87	27 1/2	+1 7/8	+7.3
N	DATAPOINT CORP	11- 68	12 3/8	+1 1/8	+10.0
N	DIGITAL EQUIPMENT	68-113	71 1/4	+3	+4.3
A	EECO INC	8- 18	9	+1	+12.5
N	ELECTRONIC ASSOC.	5- 13	7 5/8	+ 1/8	+1.6
N	FLOATING POINT SYST	13- 30	21 3/8	+2 1/4	+11.7
N	FOXBORO	28- 82	28 1/2	-2 3/4	-8.7
O	FULCRUM COMP GRP	1- 3	1/4	0	0.0
O	GENERAL AUTOMATION	3- 16	4	+ 1/4	+8.8
N	HARRIS CORP	21- 60	23 3/4	+1 3/4	+7.9
N	HEWLETT-PACKARD CO	33- 54	43 1/8	+3 1/8	+7.8
N	HONEYWELL INC	63-115	68	+2 7/8	+4.4
N	IBM	49- 73	81 1/8	+1 5/8	+2.7
O	IPL SYSTEMS INC	6- 13	5 1/2	- 3/4	-12.0
O	MAGNUSON COMP SYSTS	3- 32	3 3/8	+ 1/4	+8.0
N	MANAGEMENT ASSIST	9- 26	11 1/4	+ 1/8	+1.1
O	MINI-COMPUTER SYST	0- 4	1/2	0	0.0
N	MODULAR COMPUTER SYS	7- 32	7 7/8	- 1/8	-1.5
N	MOHAWK DATA SCI	10- 32	11 3/8	+1 5/8	+16.8
N	NCR	39- 76	55 3/8	+4 1/8	+8.0
N	PERKIN-ELMER	18- 36	19	+1 1/4	+7.0
N	PRIME COMPUTER INC	17- 49	20 1/2	+1 3/4	+9.3
N	SPERRY CORP	22- 65	23 1/8	+ 5/8	+2.7
O	TANDEM COMPUTERS INC	13- 35	23 1/4	-1	-4.1
N	TEXAS INSTRUMENTS	71-151	87 5/8	+5 1/4	+6.3
A	WANG LABS.	22- 46	22 3/4	-1 1/8	-4.7

LEASING COMPANIES

EXCH		1981-82 RANGE (1)	CLOSE JUN 23 1982	WEEK NET CHNGE	WEEK PCT CHNGE
O	BOOTH FINANCIAL CP	18- 29	22 1/2	0	0.0
N	COMDISCO INC	16- 27	17 1/4	- 1/8	-0.7
B	COMMERCE GROUP CORP	1- 2	5/8	0	0.0
O	COMPUTER INVSTRS GRP	1- 4	3/8	0	0.0
O	CONTINENTAL INFO SYS	4- 9	8	+ 1/2	+6.6
N	DPF INC	5- 13	8 5/8	- 1/8	-1.4
O	ITEL	1- 15	3/4	0	0.0
O	LEASPAC CORP	1- 2	1/8	0	0.0
N	U.S. LEASING	18- 30	21 1/2	- 3/8	-1.7

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH; B=BOSTON
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SOFTWARE & EDP SERVICES

EXCH		1981-82 RANGE (1)	CLOSE JUN 23 1982	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	1- 6	1 1/2	0	0.0
O	ADVANCED SYSTEMS INC	10- 15	11	+ 1/2	+4.7
O	ANACOMP INC	10- 19	11 7/8	+ 3/8	+3.2
O	ANALYSTS INTL CORP	3- 14	6	- 3/4	-11.1
A	APPLIED DATA RES.	13- 25	19 1/2	- 1/2	-2.5
O	ASK COMPUTER SYSTEMS	11- 17	14 7/8	0	0.0
B	ASTRADYNE COMP IND	1- 5	1 3/8	- 1/4	-15.3
N	AUTOMATIC DATA PROC	22- 32	24	- 5/8	-2.5
O	CGA COMPUTER ASSOC	4- 25	7 1/4	0	0.0
O	COMPUTER ASSOC INT'L	12- 20	17 1/2	+ 1/4	+1.4
O	COMPUTER HORIZONS	1- 5	2 1/4	+ 1/2	+28.5
O	COMPUTER NETWORK	4- 9	6 1/4	- 1/4	-3.8
N	COMPUTER SCIENCES	11- 30	12 1/8	+ 1/4	+2.1
O	COMPUTER TASK GROUP	10- 23	10 1/2	0	0.0
O	COMPUTER USAGE	2- 10	2 1/4	0	0.0
O	COMSERV CORP	9- 16	13 3/4	+ 1/4	+1.8
O	COMSHARE	6- 21	5 5/8	0	0.0
N	CULLINANE DATABASE	15- 37	29 1/8	+1 5/8	+5.9
O	DATA DIMENSIONS INC	0- 4	1/4	0	0.0
O	DATATAB	1- 4	3/4	0	0.0
O	DSI CORP	4- 9	6 1/4	0	0.0
O	DYATRON CORP	2- 11	2 1/2	- 1/4	-9.0
N	ELECTRONIC DATA SYST	15- 30	25 7/8	+ 1/8	+0.4
O	INFORMATICS INC	10- 23	13 1/4	0	0.0
O	INSYTE CORP	1- 3	2 7/8	+ 1/8	+4.5
O	IPS COMPUTER MARKET.	1- 4	1 1/4	0	0.0
O	KEANE ASSOCIATES	4- 8	4 1/4	0	0.0
A	LOGICON	12- 38	13 5/8	+ 5/8	+4.8
O	MNGT SCI AMER INC	17- 26	22	+ 1/2	+2.3
O	MATHEMATICA INC	12- 26	13 1/4	+ 3/4	+6.0
O	MATHEMATICAL APP GRP	14- 28	19	0	0.0
O	NATIONAL DATA CORP	14- 28	17	0	0.0
O	PANSOPHIC SYSTEMS	8- 15	10 1/2	- 1/2	-4.5
N	PLANNING RESEARCH	5- 13	6 1/2	- 1/8	-1.8
O	PROGRAMMING & SYS	1- 2	1 3/8	0	0.0
O	REYNOLDS & REYNOLD	16- 26	19 1/2	- 3/4	-3.7
O	SEI CORP	17- 28	23 3/4	- 1/2	-2.0
O	SHARED MEDICAL SYST	26- 37	28 3/4	- 1/4	-0.8
O	STSC INC	6- 28	9 7/8	+ 1/4	+2.5
O	SCIENTIFIC COMPUTERS	6- 16	7 1/2	+ 1/2	+7.1
O	SOFTWARE AG	6- 23	5 1/2	-1 1/4	-18.5
N	TYMSHARE INC	16- 58	16 5/8	- 7/8	-5.0
A	URS CORP	11- 18	11 7/8	- 1/8	-1.0
N	WYLY CORP	7- 20	8 3/8	0	0.0

PERIPHERALS & SUBSYSTEMS

EXCH		1981-82 RANGE (1)	CLOSE JUN 23 1982	WEEK NET CHNGE	WEEK PCT CHNGE
N	AM INTERNATIONAL	1- 15	1 1/4	+ 1/8	+11.1
A	ANDERSON JACOBSON	9- 26	9	- 1/2	-5.2
O	AUTO-TROL TECHNOLOGY	8- 62	12 3/8	+ 5/8	+5.3
O	BANCTEC INC	9- 35	9	- 1/4	-2.7
O	BEEHIVE INT'L	6- 18	6 5/8	0	0.0
A	BOLT,BERANEK & NEW	9- 25	15 3/8	- 3/4	-4.6
O	CAMBEX CORP	2- 9	2 1/2	- 1/8	-4.7
N	CENTRONICS DATA COMP	7- 40	10 3/8	+ 3/4	+7.7
A	CETEC CORP	4- 9	4	+ 1/8	+3.2
O	COGNITRONICS	2- 11	3	- 1/8	-4.0
O	COMPUTER COMMUN.	1- 2	1/2	0	0.0
A	COMPUTER CONSOLES	16- 28	20 1/4	-1	-4.7
O	COMPUTER DEVICES INC	4- 10	7 1/4	0	0.0
O	COMPUTER TRANSCEIVER	3- 9	4 1/4	- 3/4	-15.0
N	COMPUTERVISION CORP	20- 49	28	+2	+7.6
N	CONRAC CORP	17- 28	25 1/2	+1 7/8	+7.9
A	DATA ACCESS SYSTEMS	2- 13	2 3/4	0	0.0
A	DATAPRODUCTS CORP	16- 44	17 1/2	+ 1/2	+2.9
O	DATARAM CORP	4- 15	7 1/8	0	0.0
O	DATUM INC	2- 5	2 1/8	0	0.0
O	DAVID JAMISON CARLYL	3- 7	3 1/4	+ 3/4	+30.0
O	DECISION DATA COMPUT	3- 6	5 1/2	+ 3/4	+15.7
O	DELTA DATA SYSTEMS	2- 4	1 7/8	+ 1/8	+7.1
N	ELECTRONIC M & M	3- 9	3 3/4	- 1/8	-3.2
O	EVANS & SUTHERLAND	18- 40	23 3/4	0	0.0
N	GEN'L DATA COMM IND	7- 19	8 3/4	- 3/8	-4.1
O	GENERAL TERMINAL CP	0- 4	3/8	0	0.0
O	GREAT SOUTHWEST IND	1- 12	5	0	0.0
N	HAZELTINE CORP	19- 35	24 7/8	- 1/8	-0.5
O	INFORMATION INTL INC	8- 17	11	- 1/4	-2.2
O	INTEL CORP	21- 51	31 1/2	+ 1/4	+0.7
O	IPL SYSTEMS INC	5- 15	5 1/2	- 3/4	-12.0
A	LUNDY ELECTRONICS	7- 18	9 5/8	- 5/8	-6.0
A	MSI DATA CORP	11- 27	16	- 3/8	-2.2
O	NETWORK SYSTEMS CORP	14- 25	19	0	0.0
O	OMEX	3- 8	3 1/2	0	0.0
N	PARADYNE CORP	25- 52	30 5/8	- 3/4	-2.3
A	PENRIL CORP	7- 17	7 1/2	- 1/8	-1.6
O	RAMTEK CORP	9- 23	16 3/4	- 3/4	-4.2
N	RECOGNITION EQUIP	4- 21	4 3/8	+ 1/8	+2.9
O	SCAN DATA	1- 5	1 1/2	+ 1/4	+20.0
N	STORAGE TECHNOLOGY	18- 40	23 1/4	+2	+9.4
O	SYKES DATATRONICS	8- 34	11 3/4	- 3/4	-6.0
A	T BAR INC	9- 19	9	- 3/8	-4.0
A	TEC INC	4- 11	9	+ 3/8	+4.3
N	TEKTRONIX INC	43- 70	54 7/8	+3 3/4	+7.3
N	TELEX	5- 10	8 1/8	+ 3/8	+4.8
O	TESDATA SYSTEMS CP	3- 17	3	- 1/4	-7.6
A	TIMEPLEX INC	7- 19	9 7/8	- 1/8	-1.2
O	VISUAL TECHNOLOGY	10- 15	10 1/2	+ 1/2	+5.0
O	WILTEK INC	1- 3	1 1/8	0	0.0

SUPPLIES & ACCESSORIES

EXCH		1981-82 RANGE (1)	CLOSE JUN 23 1982	WEEK NET CHNGE	WEEK PCT CHNGE
N	AMERICAN BUS PRODS	11- 17	12 7/8	+ 1/8	+0.9
O	BALTIMORE BUS FORMS	1- 2	1 1/4	0	0.0
N	BARRY WRIGHT	14- 24	13 7/8	- 7/8	-5.9
O	CYBERMATICS INC	1- 2	1	0	0.0
A	DUPLEX PRODUCTS INC	12- 17	14 1/4	- 1/8	-0.8
N	ENNIS BUS. FORMS	15- 23	19 1/4	+ 1/8	+0.6
N	3M COMPANY	48- 65	53 1/2	+2	+3.8
O	MOORE CORP LTD	26- 38	26 3/4	0	0.0
N	NASHUA CORP	14- 33	14 1/8	- 1/4	-1.7
O	STANDARD REGISTER	30- 43	39 1/4	+ 3/4	+1.9
A	TAB PRODUCTS CO	14- 30	14 1/8	- 5/8	-4.2
N	WALLACE BUS FORMS	22- 36	30 3/8	+ 1/4	+0.8

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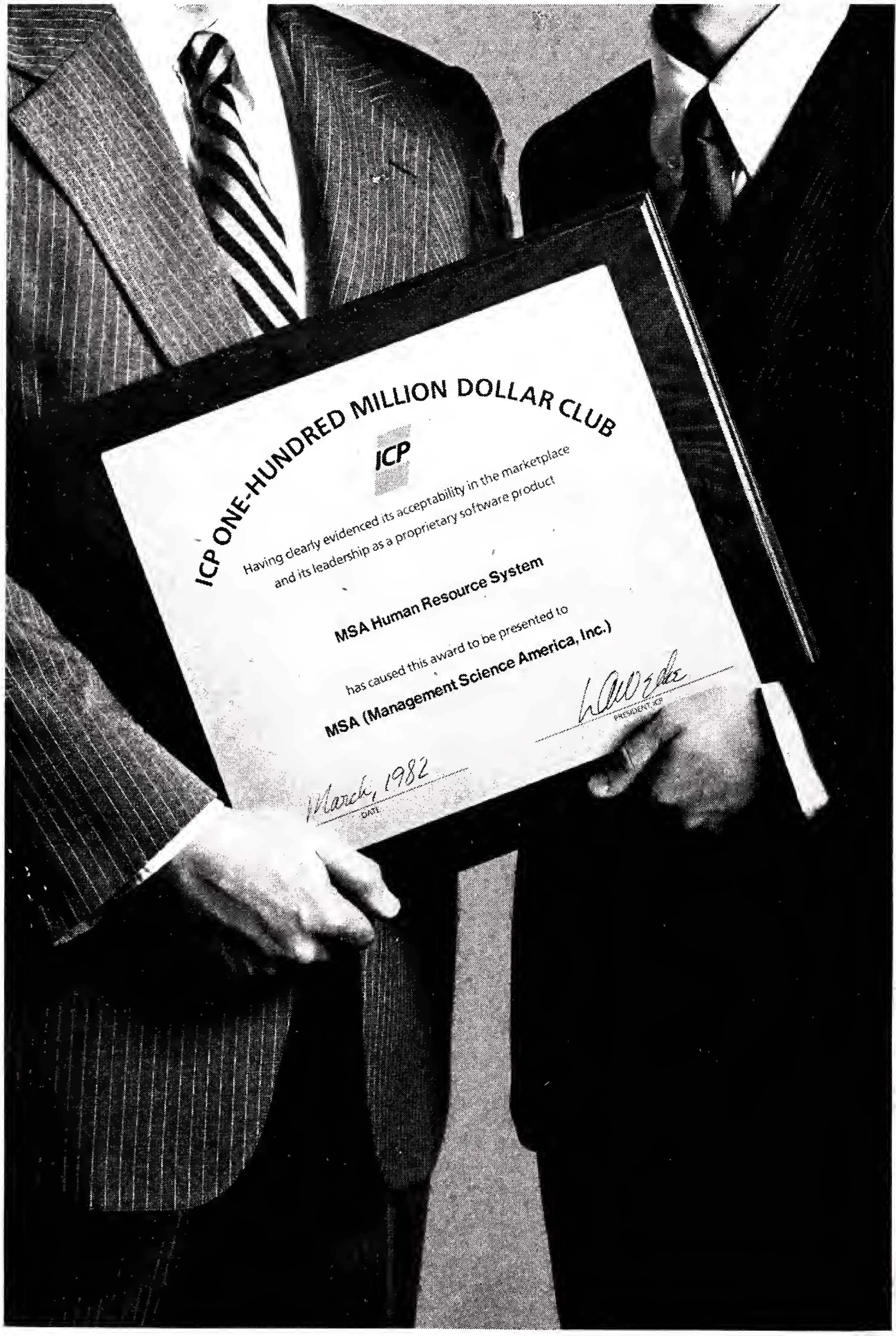

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